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ABSTRACT

The computer-based System of Interactive Guidance and Information (SIGI) was field tested and evaluated at five community colleges and one university. Developed by Educational Testing Service, SIGI assists students in the process of informed and rational career decision making. Interacting at a cathode-ray tube terminal with a computer, students examine their values, retrieve relevant information about occupations, obtain predictive data, formulate plans, and learn decision making strategies. Adopted as an integral part of the career guidance and planning program at the field test colleges, SIGI ran smoothly, was recieved enthusiastically by students and counselors, and proved effective in increasing students' mastery of career decision making competencies. This report includes detailed information about the system itself, the building of the information base, the evaluation design, and findings at each of the six institutions. The validity of the SIGI Prediction subsystem, and independent studies of the effects of SIGI are reported, as well as summaries of the evaluation findings. (Author/BW)

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SIGI®

SYSTEM OF
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SIGI: FIELD TEST AND EVALUATION OF A COMPUTER-BASED SYSTEM OF INTERACTIVE GUIDANCE AND INFORMATION

VOLUME I: REPORT

Warren Chapman
Martin R. Katz
Lila Norris
Laura Pears

In collaboration with:

Emily Glossbrenner
Amy Weber

ETS

MAY 1977

EDUCATIONAL TESTING SERVICE
PRINCETON, NEW JERSEY

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ABSTRACT

A computer-based System of Interactive Guidance and Information (SIGI) was field-tested and evaluated at five community colleges and one university. Developed by Educational Testing Service, SIGI assists students in the process of informed and rational career decision-making. Interacting at a cathode-ray tube terminal with a computer, students examine their values, retrieve relevant information about occupations, obtain predictive data, formulate plans, and learn decision-making strategies. Adopted as an integral part of the career guidance and planning program at the field-test colleges, SIGI ran smoothly, was received enthusiastically by students and counselors, and proved effective in increasing students' mastery of career decision-making competencies.

PREFACE

This thick report tells what we found in our field test of the computer-based System of Interactive Guidance and Information (SIGI) at six widely dispersed colleges. Those who are dismayed by the sheer bulk of the report will be relieved to discover Chapter XIV, "Evaluative Highlights," which contains summaries of what we believe to be our major findings. But highlights are only that--highlights. Those who want to explore some of the shadows, too, should also read Chapter XI, "Summary and Discussion of Findings Across Colleges."

But these are only summary chapters. Those who want to see the whole picture--and we believe the whole picture is worth seeing--must read most, if not all, of the report. We particularly urge readers who have no familiarity with SIGI to read Chapter II, which describes the system by following a real student through it. Reading that chapter will make the rest of the report more clear, for we have assumed that readers of Chapters III-XIV are acquainted with SIGI and know more or less what happens in the Locate system and why the Locate system follows instead of precedes the Values system.

We have built in a certain amount of redundancy so that the chapters might be reasonably independent of one another. This statement is particularly true of Chapters V-X, each of which is devoted to a separate college. The outlines for those chapters are all identical, and, unless readers wish to compare the findings at one college with those at another, they need read only the chapter devoted to the college that interests them most.

The evaluation was a large undertaking for our small staff. How can we possibly acknowledge all the help we received from everyone involved? We can't. We can only highlight the names of those who have made the evaluation possible and beg forgiveness from the host of unnamed others who also contributed.

Besides the four authors and two other members of the Guidance Research Group who assisted in the writing of this report and are named on the title page, special acknowledgement is due to William Godwin and his successor, Charles Ehrlich, for the computer system design and implementation at ETS and all six colleges; to them and Ronald Bejma for the utility programs that make possible the operation of SIGI and compilation of records; to Christine Sansone for inputting and assuring the accuracy of all the scripts and data; and to Madeline Bara, who typed, retyped, corrected, and cut-and-pasted the whole report.

We also wish to acknowledge our debt to the personnel at all six colleges who made the decision to venture on SIGI and to those who implemented it at their college: At Illinois State University, Donald Cochran, Douglas H. Lamb, David Hoffman, and Betty Green Rademacher; at Pasadena City College, Armen Sarafian, Ernest F. Neumann, Robert A. Berger, and Alice Angermeir; at Santa Fe Community College, Alan J. Robertson, Robert G. Wheless, William Noffsinger, and Sherry Bookman; at Eastfield College, Byron N. McClenney, Norbert R. Dettman, Joel Jessen, and Nancy Henderson;

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We gratefully acknowledge also our indebtedness to the Carnegie Corporation, which supported the initial development of SIGI from the time when it was only a gleam in our eye, and particularly to E. Alden Dunham, who monitored the project on behalf of Carnegie and whose unflappable faith in the achievement of our goals was almost as helpful as the money.

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Princeton, New Jersey
May 1977

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CHAPTER I

SIGI: DESCRIPTION AND RATIONALE

This report is a description and evaluation of the use of the System of Interactive Guidance and Information (SIGI) at five community colleges and one university that had volunteered to serve as field-test sites and had purchased the necessary hardware. SIGI was developed at Educational Testing Service by the authors under grants from the Carnegie Corporation. In 1972 a prototype of the system was tested in a small-scale study at a single community college (Chapman, Norris, & Katz, 1973). Elements of that study were supported by funds from the National Science Foundation. When the results looked encouraging, NSF agreed to support a more comprehensive evaluation under conditions of actual use at from three to six geographically separated sites. This was the genesis of the field tests covered in this report.

SIGI was originally designed to help community college students make informed and rational career decisions. Early in the course of the field tests, the wording of the displays was changed to make it suitable for the population of four-year as well as two-year colleges. In this guidance system, the student interacts with a computer in such a way as to examine and explore his[1] values, obtain and use relevant information, interpret predictive data, and formulate plans. This interaction helps the student to arrive at tentative career decisions and to modify them as he gains new insights and additional information. The objective is not only to help students make such decisions about educational and occupational options, but also to teach students a process of informed and rational decision-making.

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[1] The authors have followed the traditional convention of using the pronouns he, his, and him to refer to "the student," who is as likely to be female as male. We find the various alternative usages awkward and distracting. In our judgment, none has yet become widely enough adopted to represent a new convention.

Description of the System

The physical features of SIGI are somewhat different at each test site depending on the number of terminals at the college and on whether the computer is dedicated to SIGI or configured for other services as well. Each system will be described in the chapters devoted to the separate colleges. Here it is enough to note that the computer is one of the PDP-11 series of minicomputers manufactured by Digital Equipment Corporation and that the student terminals are cathode ray tube (CRT) devices equipped with typewriter-like keyboards by means of which the student can respond to messages and information displayed on the screen and can issue commands to the computer.

SIGI consists of six interrelated subsystems called VALUES, LOCATE, COMPARE, PREDICTION, PLANNING, and STRATEGY. Taken in the order named, they comprise an organic system for career decision-making. (For a more complete description, see Chapter II, which chronicles the path of an actual student at one of the colleges.) The heart of this system is the student's own values--the rewards and satisfactions he would like to realize through his occupation. In the Values system, he explores and examines his values, eventually assigning a numerical weight to each of ten occupational values to designate its importance to him. In Locate he commands the computer to assemble a list of occupations that meet or exceed his specifications with respect to any set of five of those values at a time. In Compare he asks pointed questions and gets information on all dimensions of occupations of interest. Prediction allows him to assess his ability to succeed in the coursework that prepares him for a particular occupation. Planning shows him what he must put out in the way of time and effort in order to qualify for entry into an occupation; it is also a map outlining a path to follow into an occupation. And Strategy, as the name implies, teaches a strategy for decision-making based on the rewards offered by an occupation in terms of values satisfaction and the risks of failing to get into it.

When the student has gone through these subsystems in this order, he becomes an "initiate" and is turned loose to roam through SIGI at will. The resources of SIGI are now under his control: each subsystem stores a particular kind of information or assistance that contributes to the final decision, and the student can go to the subsystem that meets his needs as he perceives them at the moment.

Thus SIGI is both a career guidance system and an occupational information system. Its aim is to produce an autonomous individual capable of making rational decisions. The decision-maker's own values provide the instrument for rationality. They serve both as objectives of the decision and as guides through the decision process.

The emphasis, however, is not merely on the content of the decisions but on the process of decision-making. As the student progresses through SIGI, he learns to move freely within the structure of the system. In gaining control of the system, he develops competencies and masters strategies for rational behavior in the face of uncertainty--which may be the closest we can get to wisdom.

Rationale for SIGI

What is the rationale for stressing the process of decision-making over the content of the decision?

Humanistic ethic. It should be emphasized, first, that the ethic of this system is humanistic rather than mechanistic. There has long prevailed a stereotype associating computers with dehumanized control. Indeed, as far back as 1928, Clark Hull (in his book Aptitude Testing), gazing prophetically into a brave new world of psychometrics and computers, proposed that a single universal battery of 30 or 40 aptitude tests be given to 8th-graders. Scores would be fed into a machine that would already contain forecasting formulas for the major occupations. The student would then choose one of the three or four occupations "in which his chance of success is greatest."

Developments in measurement, data processing, and statistical techniques over the intervening decades created a rush of excitement about the possibilities for translating Hull's dream into a reality. But the vast technological gains appeared to invoke a law of diminishing returns. Neither Hull nor his successors anticipated the stubbornness with which the data (reflecting the multipotentiality of individuals) would resist neatly differentiated forecasting formulas.

Faith in the prospects of the trait-and-factor model have persisted. The main objections to this model, however, lie not in its inaccuracies but in its premises. It assumes that prediction of occupational memberhsip and success is the main--virtually the sole--business of guidance. It starts with the explicit hypothesis that occupational sorting does tend to take place in a certain way--through trait-matching. It proceeds on the less clearly explicit conviction that occupational sorting should take place in this way--only more so. Trait-and-factor theory seems to hold that the individual is in effect "keyed" to one or a few "correct" occupations, that the key should be recognized early in adolescence, and that all subsidiary decisions--as of education--should be fitted to it. Application of this theory would presumably result in a more exact homogeneity of membership in each occupation, and would purport to reduce waste, vacillation, or error along the way. It would also tend to reduce the student's role in decision-making to one of passivity.

This is essentially a "manpower" model rather than a guidance model. The manpower model is an attempt to follow some general optimization rule for matching people to jobs. For example, an inventory of the pool of abilities on the one hand and the requirements of occupations on the other might be matched according to certain assumptions about national priorities--that is, the highest priority occupations would be filled first from the top of the suitable applicant pool, the next highest next, and so on. Or a rule analogous to minimizing the sum of squared differences between traits and requirements might be applied.

The evidence that individuals are multipotential and occupational requirements are flexible is damaging for the manpower model. But it supports a guidance model which maximizes individual freedom of choice. A guidance model hinges on satisfaction of individual values, with manpower needs helping to determine the opportunities and means for gaining such satisfactions. There is better evidence for the assumptions underlying the guidance model than the manpower model. For example, the validities of differential predictions of interests tend to be much greater than the validities of differential predictions of achievement (Norris & Katz, 1970).

This finding does not mean that predictions of success are useless in occupational choice. Clearly, there is ample justification for using actuarial data to estimate an individual's resemblance to an occupation population and the probabilities of his entering an occupation, persisting in it, and (although standards are difficult to define and data hard to come by) achieving some measure of success in it. There is much less justification for using actuarial data to determine choices. Yet the implications and practice of trait-and-factor theory have often exceeded the descriptive and tended toward the imperative. This creeping control might tend to improve some kinds of predictions by making them virtually "self-fulfilling prophecies."

If computers are used only to power a directive trait-matching approach, as appears to be proposed in Department of Labor pilot projects (U. S. Department of Labor, 1971), the stereotype of computers as encroaching on and restrictive of free decision-making by individuals will be perpetuated. One purpose of the job-matching model is to help individuals make appropriate choices. But the method excludes the individual from the decision-making process; it rests all control in external agencies, leaving the individual only the choice of acting or not acting on the output.

SIGI, on the other hand, assumes that guidance should shun even such benevolent control. It assumes that we don't know what will be best for the individual (or society) except freedom to work things out. Thus, we define the best choice as the choice that is most nearly free. But we do not define freedom as laissez faire. Rather, it is the freedom (expressed by Shaw in the preface to Man and Superman and quoted by Freud in contrasting his "reality principle" with his "pleasure principle") "to be able to choose the line of greatest advantage instead of yielding in the path of least resistance." Advantage in this sense involves some assessment of utility as well as probability. Freedom involves active participation and control. It also incorporates the notion of career decision-making as a continuous process rather than a "one-shot" episode. This sense of continuity encourages people to formulate their plans as theories to be tested, and to revise or confirm their decisions in the light of the feedback they get from outcomes. This approach allows them to learn from experience.

Process of choosing. So without directing the content of an individual's choice, it seems possible to help him in the process of choosing. This emphasis on process does not pretend to insure the "right" choice--except insofar as the right choice is defined as an informed and rational choice. Our bias--our conviction--is that in education enlightened processes are intrinsically important. Therefore, we bend our efforts to increase the student's understanding of the factors involved in choice (imperfect though our own understanding may be) so that he can take responsibility for his own decision-making, examine himself and explore his options in a systematic and comprehensive way, take purposeful action in testing hypotheses about himself in various situations and exercise flexibility in devising alternate plans.

The student's interaction with the computer embodies this model of guidance. As the student learns to control the computer and move freely through the system, he is also developing competencies for independent decision-making. The computer does not just give him an "answer" to a question; it also suggests questions for which he can provide answers. Thus in his dialogue with the computer, the student both receives and generates information, and learns how to connect the two kinds of information. Throughout, his role is active. He can change his inputs as he recycles through parts or all of the system to see what effect new premises may have on the outputs.

In short, we don't want to play the decision-making game for the student. We want to help him master the strategies for rational behavior in the face of uncertainty so that he can play the game effectively himself.

Emphasis on values. Such a system implies some principle for choosing. Otherwise, how is the individual to make order out of the rabble of impulses that beset him? He is at their mercy unless he recognizes that, essentially, he must choose between competing values. Neither suppressing nor blindly obeying his impulses, he can control them by bringing them under the rule of reason, giving each "equal time" and attention. The individual must hold himself open and receptive to different values, allowing each to speak to him as loudly as the others. This process involves active and systematic exploration of competing values so that he can answer the central question, "What do I want?"

Therefore, values are at the heart of the SIGI system. They provide the dimensions along which students analyze their own desires and along which they construe occupational characteristics. They are the theme that runs through the separate sections of SIGI, tying them together into a comprehensive whole.[2]

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[2] More detailed and comprehensive discussions of the principles of guidance that underlie the rationale for SIGI appear in various monographs and articles by the principal investigator (Katz, 1954, 1963, 1966, 1968, 1969a, 1969b, 1969c, 1969d).

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CHAPTER II

ILLUSTRATION OF SIGI INTERACTION

The remainder of this report will of necessity assume an understanding of the structure of SIGI. This structure is not easy to describe in words. Although its general features are always the same, the structural details vary according to the behavior of the individual user. The number of possible different paths through SIGI is almost infinite.

One way to describe SIGI is to look over the shoulder of a student experiencing it. We can do this by examining one of the records compiled by the computer from a random sample of SIGI users. The record we have chosen charts the responses of a woman at one of the community colleges participating in the field test. Since every student uses the system in a unique way, the model student should not be regarded as "typical." We chose her because her record illustrates a number of the most important features of the system.

Student Printout

The printout of the student's interaction has been cut up and reproduced as Figure 1, pages 1-6, at the end of this chapter. The leftmost column of the printout contains the descriptive tags ("INTR4," "END2," etc.) that identify the place in the program where a response occurred. The second column lists the response number, value weight, specification level, or whatever, that constituted the response. The remaining columns clarify or give meaning to that response. Generally the tags and labels have no meaning except to the SIGI research staff. They will be explained in the description that follows.

Let us now sit down at the terminal and go through SIGI with her.

Figure 1, Page 1

DATE. This is the date of the student's first session.

INTIN. This is the time (12:01 p.m.) when the student signed on and entered the introductory (INT) section of SIGI.

STATUS. The variable STATUS keeps track of where the student is in SIGI. SIGI was designed to meet two needs related to career decision-making. First, it attempts to meet the need for a rational and orderly method of decision-making. Second, it meets the need for an information system that will supply the various kinds of data that a rational decision requires. The first need should be satisfied before the second because the student must have some systematic way to handle information before acquiring it. In order to teach a rational method, SIGI leads the beginner, or NOVICE, through the subsystems in an order that constitutes an algorithm for decision-making. What this order is will become apparent as we follow this student's interaction. The student's STATUS counter is incremented every time she finishes a subsystem so that, if she then signs off, the computer can start her at the right place when she returns. When the student finishes the last subsystem, Strategy, her status reaches 7. At this point she will presumably have mastered the method and will be competent to use SIGI mainly as an information system. She then becomes an INITIATE with the privilege of roaming through SIGI at will.

INTR4. Many displays are in a multiple-choice format. The display asking about the student's enrollment status has four categories of responses. This student's response, 3, indicates that she has already undertaken some college work. The computer will store this response and will look at it whenever it must select a display that is worded one way for a returning student and a different way for a student who has not yet enrolled.

INTR5. This is the student's age category.

INTR6. Data on age and sex are used only for research studies. No displays in SIGI are differentiated on the basis of age or sex; males and females get exactly the same treatment.

PRT1. Students may get hardcopy printouts of various SIGI displays for study off line. The printer is wired to the terminal and simply copies what the student is looking at. In this case, the display summarizes the student's responses to INTR7-10, which constitute an introduction to the decision-making model embraced by SIGI.

INTR7-INTR10. After INTR6, the student responds to displays asking about the four major aspects of decisions about occupations: Does she know which values are important to her? Does she know which occupations are likely to satisfy her values? Can she successfully predict her grades in the courses she will be taking as she prepares herself for an occupation? Does she know which courses and other steps to take in the preparation? The model student's answers are in the middle range between confidence and doubt. PRT1 (above) shows that the student wanted a record of her responses to these questions.

INTR11. The introduction concludes with a tiny "computer-assisted instruction" (CAI) sequence consisting of a single display with feedback. The student is asked to identify a logical first step in a decision-making process. She got the right answer: She should examine her values so that she will know what satisfactions and rewards to look for in an occupation. This sequence leads her directly into the subsystem where the examination occurs.

The Values System (VALIN-VAL10)

VALIN. This is the clock time of her entry into the Values system.

VAL2. In the Values system the student weights the importance, to her, of each of ten occupational values. The weights are on a scale of 0 (no importance) to 8 (highest importance). Another tiny CAI sequence introduces the weighting process. The record shows that the student understood the explanation, for she made the correct response to the test question.

VAL3-VAL6. The order in which things appear in the student record is different from the order in which they happen at the terminal. The chronological order is VAL5 (with VAL3 appearing just before notation of the weight assigned to Interest Field), END2, END5, INCON3 (each of which may appear more than once), VAL4, and VAL6. In this discussion they will be treated in that order rather than in the order in which they are listed in the record.

VAL5. This is the record of the weights the student assigned to each value when she considered them one at a time. The value is defined in operational terms and the student considers the importance (to her) of satisfying that value through her occupation. Income is defined as having more than enough to live on. Interest Field is the importance of working in a particular field of interest; before weighting that value, the student selects the field of paramount interest to her: Scientific, Technological, Administrative, Personal Contact, Verbal, and Aesthetic. (The tag VAL3 shows that this student selected the Scientific field.) Early Entry is the importance of entering an occupation without long delay for training and education; it is a kind of reverse education value--the greater the weight, the less tolerance for prolonged education. When she finished weighting the values one at a time, she saw them brought together in the form of a histogram and was given the opportunity to adjust the weights. VAL5 records the weights at the conclusion of this process. For this student, Income and Security, weighted 5, were the most important values. It is curious that the sum of all her weights came to only 31. For most students the sum is much higher, about 50. Apparently none of the SIGI values was of pressing importance to this student.

END2-END5 (first occurrence). With the preliminary weighting completed, the student engages in a playful, nonthreatening Values Game. To begin the game the student had to choose between two imaginary "jobs," one as a Tenurist, featuring a maximum amount of Security (the last item, VALUE GAME JOB ACCEPTED, in END2) and the other as a Velociter, featuring Early Entry (the first item in END2). She chose Tenurist. She was then faced with another dilemma: Her job as Tenurist lacked opportunities for Leadership. Did she want to quit and try another job? She decided that she would stick with the Security that Tenurists enjoy. But when she was tempted by the offer of a job as Buckster, featuring a good income (first item in END5), she decided to take it. Thus the information tagged in END2 and END5 is the choices she made in a series of bipolar confrontations in one game. Sometimes the confrontation involves the news that the job is deficient in opportunity to satisfy a value. At other times the dilemma is in the form of a temptation to switch to a job offering unusual opportunities to satisfy a rival value. The order in which the values appear is unrelated to the weights the student assigned in her previous interaction. To the extent possible, the order is random.

END2-END5 (second occurrence). In her second game, she stuck to her job as Buckster in the face of bad news or temptations with respect to Prestige, Independence, Helping Others, Variety, Interest Field, and Leisure (END2). She quit, however, on learning that her job lacked opportunities for Leadership (END5).

INCON3 (first occurrence). The computer compares the weights previously assigned (as recorded in VAL5) to the "winners" and "losers" in the Values Game. This student had weighted High Income at 5 and Leadership at only 2. Nevertheless, she had rejected a job featuring the preferred value because it was deficient in the less cherished value. This inconsistency is noted in INCON3. (The student would also be inconsistent if she stuck with a job featuring a value she had weighted less than the rival value. This student did not fall into that kind of inconsistency, and no INCON2 messages appear in her record.)

END2-INCON3 (third occurrence). The student must play enough games to allow for the appearance of all ten values at least once. After that, she can play as many games as she finds useful or entertaining. This student elected to play a third game. This time the luck of the draw once again presented her with the opportunity to be a Buckster (last item in END2), and she chose that occupation over one featuring Prestige (first item in END2). She also preferred High Income to Independence, Leadership, and Leisure, but not to Interest Field (END5). Her choice of Interest Field over High Income was inconsistent with her value weightings, and she got a message to this effect (INCON3). The messages delivered to the student in the END2, END5, and INCON displays are mere reports of outcomes. No analysis or statistical inference is attempted on the basis of such a brief game. The purpose of the game is to stimulate reflection about values, not to scale them.

VAL4. Before proceeding to the final adjustment of her value weights, the student is offered the opportunity to change the field of interest (Scientific) that she selected earlier in VAL3. She accepted the offer, but in the end decided to stick with her earlier choice.

VAL6. The student must now readjust her value weights, but this time with the restriction that they sum to 40 points. This restriction forces the student to consider the relative, as opposed to the absolute, importance of each value--i.e., to establish priorities. For most students, it also underlines the sad fact that decision-making nearly always involves trade-offs. For this student, however, the restriction is something of a dividend, for she can increase her total weights by nine points. VAL6 records the adjusted weights. Interest Field, which had been tied with High Income, became her top value, Security was relegated to second place, and the range extended from 7 to 1 instead of 5 to 1. These results seem consistent with the outcomes of the Values Games. Since the restriction to 40 points did not force trade-offs on this student, one may speculate that the difference between pre- and postgame weights was due almost wholly to the impact of the Values Game.

VAL7-VAL10 (Figure 1, page 2). Interaction in the Values system concludes with a CAI sequence that reinforces the concept of weighting one's values and leads into the next system, Locate. The student recognized (VAL7) that one reason for weighting values was to direct the search for occupational information. She also understood (VAL8) the concept, the greater the value weight, the more important the value. She recognized (VAL9) that if a person gave a high weight to Security, he would probably prefer a secure job (Autonomist, an imaginary job) to a job featuring some other value. And in VAL10, she saw that the second step in a rational decision-making process should be to identify a set of occupations that are likely to satisfy her more important values. Such an identification is the function of Locate. At this point she could choose between signing off or going directly to Locate. She chose to go to Locate.

The Locate System (LOCIN-LOC9)

LOCIN (Figure 1, page 2). The student took 58 minutes to reach the Locate system. She went more slowly than most students.

LOC3 (Figure 1, page 2). In Locate, the student selects a set of five of the ten values and then specifies a minimum of return that she would accept from an occupation on each value. (For Interest Field, the specification is for one of the six fields of interest.) This student chose her five top-weighted values (first column) and specified the levels and interest field named in the right column. The numbers that precede the specification label are the numerical equivalent of the specification--five levels for High Income, six fields for Interest Field, and four levels for each of the other eight values.

LOC4 (Figure 1, page 2). These three columns list the occupations, with their identification numbers, that were retrieved with the values/specifications named in LOC3. All of the occupations in SIGI have been rated on the opportunity they provide to satisfy each of the ten values. The rating scale is the same as that used to designate the level of specification. Consequently, the meaning of LOC4 is that all the listed occupations are rated at 3 or above on Income (i.e., their median salary exceeds $11,000 per year), lie to some extent in the Scientific interest field, offer an average or above average opportunity to help others, and so on. If no occupation had been retrieved, the student would have been forced to loosen specifications. If more than 20 had been retrieved, she would have had to make them more strict.

PRT2 (Figure 1, page 2). The student decided to get a printout of LOC3 and LOC4, which are combined into a single display with the values/specifications on the left and the occupations retrieved with them on the right.

LOC5 (Figure 1, page 2). As a novice, the student is exposed to an explanation of how SIGI retrieves occupations. Its purpose is to reinforce the concept that occupations retrieved in Locate have special significance in terms of the student's own values. The explanation ends by asking the student whether any of the occupations that had been retrieved for her required more education than she was contemplating. For this student the answer was yes. The display tagged LOC5 told her to use Early Entry as one of her search values and to set its specification at the level of education she would accept. For example, by specifying that the retrieved occupations should require no more than two or three years of educational preparation, she would eliminate from the list all occupations that required a bachelor's or advanced degree for entry.

LOC6-LOC8 (Figure 1, page 2). The student is now offered four options: (a) to learn why a particular occupation was not retrieved; (b) to change the specification on one or more of the values originally selected; (c) to assemble a different set of values for the purposes of retrieval; or

(d) to get out of Locate. The student chose the first option (LOC6) and asked why Physician's Assistant (LOC7) had not been retrieved. As it happened, the occupation had been retrieved. She then asked why Registered Nurse had failed to appear and learned (LOC8) that that occupation failed to meet her specification for Income.

PRT4 (Figure 1, page 2). The student asked for a printout of the information about Registered Nurse. The information as to fit/not fit is presented in the same display as the values/specification so that she will know which specification was too high when she studies the printout off line.

LOC6 (Figure 1, page 2). This time the student decided to change a specification for one of her original set of values.

LOC3 (Figure 1, page 2). She reduced the specification for High Income from 3 to 2--from a minimum of $11,000 to a minimum of $8,000. The other specifications were unchanged. The student's behavior seems to be related to the disclosure that Registered Nurse failed to meet her earlier specification.

LOC4 (Figure 1, page 2). A second set of occupations is retrieved. It of course contains all the occupations in the first set, since they exceed the lowered specification for Income, and four new occupations: 193 Registered Nurse, 221 Biology Teacher, 227 Mathematics Teacher, and 229 Physical Science Teacher.

PRT2-LOC6 (Figure 1, page 2). The student got a printout of the revised list and, apparently satisfied now that Registered Nurse had been made to appear, elected to move out of Locate.

LOC9 (Figure 1, page 2). Locate concludes with another tiny CAI sequence that is designed to introduce the novice to the next subsystem of SIGI and the next logical step in a rational decision-making process.

That step is to inform herself about the occupations uncovered in Locate. The Compare subsystem, which is the occupational information system, provides the opportunity to do that.

Compare System (COMPIN-ENDFIL)

COMPIN (Figure 1, page 2). The student could have signed off after completing Locate, to begin in Compare when she returned; or she could go to Compare immediately. She chose the latter course. She spent 20 minutes in Locate and had now been on SIGI for one hour and 18 minutes.

SAVE (Figure 1, page 2). Compare gets its name from the fact that the student is informed about three occupations at a time so that she can compare them with one another. SAVE is a reminder list of the occupations that are presumably of paramount interest to her. At this point the list contains all the occupations that were retrieved in her two passes through Locate. The student does not have to select from this list; she may select any occupation in SIGI for use in Compare.

OCC2 (Figure 1, page 2). These are the three occupations she chose for query. They were all on the SAVE list.

COMP4-PRT5 (several occurrences, Figure 1, pages 2 & 3). The questions available to the student are shown in Figure 2. She may designate up to five questions at a time, and the answers will then be displayed in sequence in the format shown in Figure 3. Each COMP4 tag means that a question was asked (the number in the second column is the number of the question as shown in Figure 2), and the third column indicates the nature of the question. The tag PTR5 means that the student asked for a printout of the answer. Thus this student asked questions 1, 2, 4, 8, 10, 11, 12, 13, 16, and 27 with respect to Registered Nurse, Physician's Assistant, and Public Health Specialist. Among the questions are two that concern her top-weighted values: number 11, High Income, and 16, Interest Field.

SAVE, OCC2, COMP4 (Figure 1, page 3). When the student's preselected questions, up to five in number, have been answered, she is given the opportunity of selecting more questions, assembling a new set of occupations to ask about, or moving on in SIGI. This student exercised the first option the first time it was presented to her, as shown by the fact that she asked ten questions about her first set. Next she assembled a new set consisting of Registered Nurse, Flight Attendant, and Advertising Copywriter. Note that the latter two were not among the SAVE occupations when she entered Compare. The computer added them to the list, and they appeared when she assembled her third set of occupations (see the third occurrence of the tag SAVE). The student asked five questions (and demanded no printouts) about her second group of occupations. She then assembled a third set of occupations, Registered Nurse, Purchasing Agent, and Secretary, and asked four questions about them. Since Registered Nurse was a member of each set, one may infer that this was her first-choice occupation at this time and that she was comparing it with potential rivals.

TRY1-TRY5 (Figure 1, page 3). The student now elected to move out of Locate. As a novice, she was exposed to a short review of the decision-making process taught by SIGI. The five steps that constitute the process, along with two "distractors," were displayed in scrambled order. The student was asked to identify the first step, then the second, and so on. This student identified the first three steps correctly (TRY1-TRY3), but it took her two attempts to get the correct answers for the fourth and fifth steps, which involve prediction and planning. The next two systems she would encounter concern those activities.

LOGOUT (Figure 1, page 3). The student decided to sign off and to begin with the Prediction subsystem when she returned. She had been at the terminal nearly two hours.

Prediction System (PREDIN-PRT6)

The purpose of the Prediction system is to help the student assess her abilities with regard to the academic preparation for entry into various occupations. The assessment takes the form of a probability table showing what her chances are of getting a final grade of A to B, C, or below C in a course that represents some curriculum or "major" of interest. Predictions of this sort depend on institutional studies to determine the degree of correlation between some predictor variable(s) and the final grade. If these studies have not been completed, the computer simply omits the Prediction system and all references to it. In that case, the novice would go from Compare to Planning.

INTIN-PREDIN (Figure 1, page 4). The student returned at 10:58 the day after the preceding interaction. Her status had climbed to 4, and the computer consequently sent her to the Prediction system. The computer once again asked about her enrollment status, for it could have changed between sessions. The rest of the introductory interaction is omitted for returning students, and she entered the Prediction system one minute after she signed on.

RANK-ENGH (Figure 1, page 4). The computer collects data about the student's previous performance. RANK asks the student to report her rank in her high school graduating class (top fifth, second fifth, etc.). MATH and ENG are her average high school mathematics and English grades.

ENGH is the answer to the question, "Do you need help with English?" Her responses are stored for use as potential predictor variables. If the student's college had a mandatory testing program, the computer would also ask for test scores, which would likewise become potential predictor variables.

PRED2 (first occurrence, Figure 1, page 4). The student picked from the list of predictable programs the one that was of interest to her--Nursing, in this case. For each program the college has designated a key course. (The key course for Nursing is named in the right-hand column as BY 110, General Biology.) A key course is defined as one that comes early in the program, that more or less represents the kind of aptitudes and activities required for success in the program, that is taken by most of the students in the program, and that tends to separate those who will succeed in the program from those who will not. The prediction will be made for the key course, not the program that it represents. What is the prediction based on?

PRED4 (first occurrence, Figure 1, page 4). The computer presents the student with five pieces of information about the criterion and asks her to respond with self-estimates of her competency. The first piece is Grade Factor 1, interest in the subject matter of the course. The student sees a description of the subject matter (prepared by the college) and rates her interest in it as above average, average, or below average. This student rated herself as 1, or above average, on this factor. Grade Factor 2, the second item, asks her to rate herself on the degree of her commitment to the program that the key course represents; in this case, she rated herself as above average on her commitment to Nursing. Items 3 and 4 require a little more explanation. When the validitiy studies for the system were begun, teachers of each key course selected two factors--Grade Factors 3 and 4-- from a menu of 29 potential factors that our research had shown were linked to good grades in the minds of faculty. The factors cover such competencies and attitudes as ability to think logically, knowledge of basic English skills, finger/hand dexterity, keeping up with homework, and so on. (The complete list appears on Form B of Appendix A, the Prediction System Manual and Forms.) For BY 110, Factor 3 is knowledge of English fundamentals, and Factor 4 is regular attendance. The student rated herself as average on the former and above average on the latter.

PRED5 (First occurrence, Figure 1, page 4). The fifth piece of information about the criterion is a histogram showing the distribution of grades of former students in the class. Text of the display interprets the histogram for the student. She now sees a display (Figure 4) containing all of her relevant inputs--previous performance, self-ratings on the grade factors, and distribution of course grades. She then estimates her own grade in the course. This student estimated her grade as B.

PRED6 (first occurrence, Figure 1, page 4). Predictions are computed from regression equations stored in the computer. The equations were derived from validity studies that we conducted when the local Prediction system was being developed. If the college has a mandatory testing program, two regression equations are stored for each key course, one containing test scores among the predictor variables and the other excluding them. Possible predictor variables include biographical data (sex is never used, and age was used once by one college for one course), the record of previous performance (rank, English grades, and mathematics grades), test scores (if any), self-ratings on the four grade factors, and estimated grade. No more than three variables are used for any key course, and no prediction is rendered if the combination of variables produces a multiple R of less than .40. The prediction for this student was that she has 65 chances in 100 of getting an A or B in Biology 110, 25 chances of getting exactly C, and 10 chances of getting a grade of W (withdraw--her college does not assign grades below C).

PRED10 (Figure 1, page 4). The prediction chart does not explicitly tell the student what her chances are of passing the course. Therefore she is asked to indicate what her chances are getting a C or better. This student correctly added 65 and 25 and saw that the answer was 90.

PRT6 (first occurrence, Figure 1, page 4). She asked for a printout.

PRED11. The student may now ask for another prediction, may ask a question about predictions, or may move on. She chose to ask a question and was presented with the menu reproduced as Figure 5. The concept of probability is not easy for students to grasp, and the opportunity to ask questions is SIGI's attempt to cope with that problem. This student wanted to know whether to interpret her prediction favorably or unfavorably.

PRED36-PRED29 (Figure 1, page 4). The question is answered in an interactive sequence of some eighteen displays. The record of an archer's score in target practice provides an analogy for using records of past academic performance to predict future academic performance. The sequence ends with a few displays explaining that "goodness" and "badness" depend partly on the expectations or hopes of the student and partly on the requirements for achieving the student's goal. This student apparently followed the sequence with considerable care, for she made only two incorrect responses during the interaction (PRED40 and PRED23).

PRED2-PRED6 (second occurrence, Figure 1, page 4). The student sought a second prediction, this time for Business Administration (key course, BA 211, Accounting). She rated herself as average on the four grade factors (Grade Factors 3 and 4 were good reading ability and ability to work independently), and estimated her final grade as B. The new prediction was added to her chart and both were displayed simultaneously. In BA 211 she had 40 chances of A or B, 30 chances of C, and 30 chances of W.

PRED2-PRED6 (third occurrence, Figure 1, page 4). The student followed the same procedure to get a prediction for the Physician's Assistant program (key course, BY 251, Anatomy and Phsyiology). She rated herself as above average on all four grade factors (Grade Factors 3 and 4 were in this instance superior memorization and good reading ability), and estimated her grade as B. The probability figures, displayed on the same chart as the previous two, were 55 chances of A or B, 35 of C, and 10 of W.

PRED2-PRT6 (fourth occurrence, Figure 1, page 5). The student asked for a fourth prediction, this time for Registered Nursing (this is a two-year program and is not the same as the Nursing program that was the subject of her first inquiry). The key course for Registered Nursing is the same as the key course for Physician's Assistant, which had already been predicted. Therefore the prediction was simply repeated. There were now four predictions displayed--all that the student was interested in. She asked for a printout. She then moved on to the Planning system without signing off.

Planning System (PLNIN-PLN19)

The purpose of the Planning system is to supply information about what the student should do, after graduation from high school, in order to prepare herself for entry into an occupation. Such information will help her decide whether the occupation is feasible for her in terms of what she is willing and able to put into preparation for it. Can she meet the demands on her resources of time, energy, money, and ability? Another purpose of the system is to provide the student with an agenda for entry into an occupation once she has selected it.

The Planning system gives, first, general information about the steps, beyond high school, that lead to entry into the occupation, including requirements (if any) for certification and licensing. Second, it gives specific information about the program of study that the student should take at her college, the prerequisites for admission into that program, and the names of institutions to which the student can transfer in order to complete her preparation. The local college prepares the displays containing the second class of information; the displays are added to the college's SIGI disks at ETS and the disks are mailed to the college. If the college has not completed the local displays, the interaction in the Planning system stops at the end of the generalized displays. The college that the model student attended had a complete Planning system with local information.

PLNIN (Figure 1, page 5). The student went directly to the Planning system from the Prediction system without signing off. She had spent 29 minutes in the Prediction system.

SAVE (first occurrence, Figure 1, page 5). SAVE now consists of the

19 occupations retrieved in Locate, to which were added the four new occupations that the student requested in Compare: Advertising Copywriter, Flight Attendant, Purchasing Agent, and Secretary.

PLN2 (first occurrence, Figure 1, page 5). The student chose Secretary for her first tour through Planning.

PLN13 (Figure 1, page 5). The student was asked if she was willing to tolerate the amount of time that preparation for her occupation would require. For the purposes of the Planning system, the occupations in SIGI are classified into six categories: PROF (graduate study required for preparation), GRAD (graduate study recommended), BACH (a bachelor's degree required), SHUD (a bachelor's degree recommended), WICH (two mutually exclusive paths to entry, one requiring a bachelor's degree and the other not), and TERM (less than a bachelor's degree required for entry). Secretary is classified TERM, and hence the student's response signified that she was willing to accept up to three years of education as a condition for becoming a secretary. Had she been unwilling to accept so long a span of time, she would be allowed to abandon Secretary, to choose an alternative occupation, to inquire about General Studies, or to exit from Planning.

PLN15 (Figure 1, page 5). Now the student was asked if she thought herself capable of passing the required coursework. The display that asks about her abilities includes the answer to question 7 from Compare, "Examples of College Courses?" On the basis of this information our model student signified that she had the ability to complete a secretarial program successfully.

PLN3 (first occurrence, Figure 1, page 5). The student is invited to see a pair of displays that discuss the rewards and risks of aiming at an occupation that is academically hard to get into as opposed to finding an easier alternative. This student decided to ignore those displays, presumably because she was confident that there was little risk, for her, in attempting the secretarial program.

PLN23 (first occurrence, Figure 1, page 5). The student's decision not to abandon Secretary generated a sequence showing her, first, a general plan for achieving her goal (Figure 6); second, the high school prerequisites for admission into the secretarial program at her college (Figure 7); and, third, the program itself (Figure 8). If achievement of her occupational goal had required transfer to another institution--say, from a community college to a four-year college or from a four-year college to graduate school--a fourth display would list the most practicable institutions. At the end of the sequence the student is asked whether, having seen the requirements for preparation, she now wishes to pursue the occupation. This student replied no.

PLN21 (Figure 1, page 5). Was the decision to abandon the occupation due to the amount of education it required? If the student answers yes, SIGI will propose a method of locating alternative occupations similar in their values structure to the one that was rejected but less demanding in education. The design of SIGI allows occupations to be clustered in accordance with innumerable combinations of value satisfactions. By using Early Entry as a search variable in Locate, a student may specify any level of education that she will tolerate in preparing for an occupation. The model student, however, did not reject Secretary because it demanded too much education.

SAVE-PLN2 (second occurrence, Figure 1, page 5). The student chose another occupation for inspection, Registered Nurse.

PLN12 (Figure 1, page 5). Registered Nurse is classified WICH, since mutually exclusive two- and four-year paths to entry exist. She chose the four-year path.

PLN10-PLN23 (Figure 1, page 5). The student signified that she was willing to spend four years in preparation, was able to cope with the kinds of courses she would take, was desirous of inspecting the displays that discuss the rewards and risks of aspiring to a difficult goal, and decided to proceed farther with the occupation. As a result, she saw the local college sequence of prerequisites, program, and (in this case) transfer colleges. Then she was asked once more whether she wanted to pursue the occupation. This time she answered yes.

PLN4-PLN25 (Figure 1, page 5). Her acceptance of nursing now generated a new sequence designed to help her become enrolled. PLN24 asked her whether she had completed the prerequisites for enrollment (she had), and PLN25 asked whether she wanted to see information about financial aid. Her yes response led to five displays outlining the major sources of student assistance available at her college, as well as naming the places where she could get detailed information. Other displays showed her how to estimate whether or not she would lose academic credits by transferring into the nursing program, and they provided information about how to enroll.

PLN 19 (Figure 1, page 5). The student had seen the four-year path to entry into her occupation. SIGI now asked her if she would like to see the two-year path. She declined and moved into the Strategy section.

Strategy System (STRIN-STR25)

The purpose of the Strategy system is to propose a method for making decisions in the face of complexity and to lead the student step by step through the process. By the time the student has reached Strategy, she has encountered many different kinds of information, more of each kind than she is likely to remember. How should she incorporate what she now knows about her values into what she has learned about the 23 occupations competing for her attention in SAVE? What roles should prediction and planning information play? Is hard-earned information about her options to be neglected simply because the student does not see how to fit it into her decision?

STR3-STR10 (Figure 1, page 5). Strategy begins with an assessment of the rewards one may expect from a decision provided that it is realized. In order to illustrate the process, the computer follows members of the Logic family as they buy new cars. They weight four automotive values and, gathering information from magazines and pamphlets, rate three automobiles on their potential to satisfy each of the values. Finally, they multiply the weight they assigned to a value by the an automobile's rating on that value, add the four products thus obtained for each car, and compare the sums (called Desirability Sums in SIGI). A Desirability Sum may be represented by the following formula, where W = the numerical weight assigned to a value, R = the rating of an option (e.g., a car, an occupation) on its capacity to satisfy the value, and N = the number of values that the decision takes into account:

$$\text{Desirability Sum} = \sum_{i=1}^{N} W_i R_i$$

A Desirability Sum is the wedding of what the student wants, as represented by the value weights, with what reality offers, represented by the ratings on the values. As it turns out, one car is "best" for one member of the family, a second car for another, and the third car for the third Logic.

The process of obtaining Desirability Sums is developed in a sequence of CAI-like displays demanding reasoned responses from the student. The model student got all these right except the last (STR10). She failed to see that the reason why a different car was "best" for each member of the family was that each Logic had a different structure of values.

STR11-VAL6 (Figure 1, page 5). The strategy that the Logics used to evaluate cars will now be applied to occupations. Since value weights are obviously important in computing Desirability Sums, the student is invited to review them. The model student accepted the invitation. VAL5 shows the weights as she left them upon her departure from the Values system. VAL6 shows the adjustments she made on this occasion: She deducted one point from the weight of High Income and added it to Interest Field. (The student chose the Scientific interest field on her previous trip through the Values system. She was invited to change the field before she reweighted her values, but she declined. The printout would have recorded any interaction involving the selection of a new field.)

SAVE-STR14 (Figure 1, page 6). The student next selected three occupations that she was considering: Registered Nurse, Physician's Assistant, and Purchasing Agent (STR14). The first two had been retrieved in the Locate process, and Purchasing Agent had been selected for brief examination in Compare. (The student could have selected any occupation in SIGI.) She was then asked which of the three she considered to be her top choice; she chose Physician's Assistant (STR12).

Now the Desirability Sums were worked out. Figure 9 shows the culmination of that process. The computer first displayed the form for the table containing the names of the occupations, the list of values, and the value weights. Next, the ratings of the three occupations on Income appeared (3, 3, and 4) and the student was invited to see the information that would explain the basis for the ratings or to go on to the ratings on Prestige. Had she asked to see the basis (she did not do so for any of the values), the screen would have been erased and the student would, in effect, be transported back to the Compare system. There she would see the answer to question number 11 ("Average Income?"); the income figures would show why the ratings of the three occupations differed with respect to this value. This privilege of accessing verbal information that explains the numerical ratings is available for each value, and the student could alternate between Strategy and Compare ten times if she happened to be curious about the rating of every value.

When the ratings have all appeared, the computer calculates the Desirability Sums. The computation takes place before the student's eyes, and the swift appearance of the thirty products followed by the sums contributes a small moment of drama to the SIGI experience.

This phase of Strategy concludes with a brief discussion of the outcome with respect to her top-choice occupation: Physician's Assistant, with a Desirability Sum of 118, would be a satisfactory choice among these occupations if the sole criterion for selection were desirability. (Students are told to disregard differences of less than 10 points.)

STR16-STR26 (Figure 1, page 6). The emphasis now shifts to the risks side of the decision equation. The interaction leads the student to four simple concepts: (a) The student should reject an option that is impossible to attain; (b) the student should reject an option that offers a worthless reward; (c) the best option, if it exists, combines the largest reward with the least risk; and (d), if none of these combinations is present, the student must accept greater risks if she hopes to maximize reward, or accept reduced rewards if she hopes to minimize risk, or settle somewhere in between. Again, the teaching mode is CAI. The model student got three wrong answers in this sequence. She said she would choose a (hypothetical) occupation with a large Desirability Sum, even though it would be impossible to attain (STR16). She failed to observe that one of three (hypothetical) occupations in a list offered a combination of maximum reward and minimum risk (STR20), and, given another set of three hypothetical occupations, she failed to notice that none of them satisfied the largest reward/least risk formula. Perhaps she was pressed for time and was hurrying.

Now the student estimated her own risks with regard to the three occupations she had selected earlier. She told the computer what she thought the chances were (chances in 100) that she would successfully complete all the steps required for entry into the first occupation, then the second, and, finally, the third. Displays advised her in her estimation, telling her to consider the number of steps involved and the difficulty of each step. The occupational overview (Figure 6), which the student might have seen earlier in the Planning system, provided information about the preparation task. The student could examine this display as often as she wished until she signified that she was ready (STR26) to make a statement about her chances.

STR23 (Figure 1, page 6). The student reported her chances of successfully entering the Nursing, Physician's Assistant, and Purchasing Agent occupations as 88, 75, and 50, respectively. Although these estimates might seem somewhat optimistic considering the job market at the time, they are nevertheless useful in decision-making. The student's evident interest in the health professions suggests that she may already have some investment of study or experience in Registered Nursing and Physician's Assistant which she might lose if she switched to Purchasing Agent. Furthermore, Physician's Assistant is a fairly new occupation; there are far fewer programs for that occupation than for Registered Nurse, competition for admission is fierce, and candidates with previous experience are favored over rank novices. In short, the student probably succeeded in rank ordering these occupations on the basis of her chances of getting into them. There is, of course, no way to determine the amount of error in her estimates.

STR24 (Figure 1, page 6). The student was asked to designate again her top choice of these three occupations in light of what she knew about their rewards and risks. She switched from Physician's Assistant to Registered Nurse. This was a logical choice, since the two occupations were essentially equal in desirability, but Registered Nurse would be easier to get into. Her choice generated a display saying that the choice was logical because Registered Nurse had the highest (or within ten points of the highest) Desirability Sum and also the best chances for successful entry. Had she designated another occupation, the wording of the display would have been different.

PRT12 (Figure 1, page 6). The student asked for a printout of the display containing her Desirability Sums, estimated chances, and discussion.

STR25 (Figure 1, page 6). The system contains advice on how to use the Prediction system for help in estimating risks. The advice is optional, and the student declined to see it.

Activity as an Initiate

EXIN-EX2 (first occurrence, Figure 1, page 6). The student was now promoted to initiate. In this status she became free to move at will among the subsystems in SIGI, and her path within any system would be much shorter than it was when she went through the system as a novice. Displays that were previously mandatory would now be optional, and the "CAI" that reinforced the concepts underlying the Values, Locate, and Compare systems would be skipped. The vehicle for moving from system to system is the menu shown in Figure 10. The model student decided to return to the Values system once more and elected option 2.

VAL5-EXIN (Figure 1, page 6). The initiate returning to the Values system does not go through the whole system. Instead, she is given the opportunity to play the Values Game again (this student declined) and then to adjust the weights she assigned earlier. VAL5 lists the weights as she found them and VAL6 as she left them. Since the weights in the two listings are the same, the student was apparently satisfied that she had finally got them as refined as she could. Then she was returned to the menu (EXIN).

EX2 (second occurrence, Figure 1, page 6). This time the student decided to sign off.

SO2 (Figure 1, page 6). The display the student asked to see contained information about applying the SIGI decision-making model to occupations that are not in SIGI. The display encourages the student to use her values as a guide for judging the occupational information in non-SIGI sources, particularly the Occupational Outlook Handbook. She is also advised to ask her counselor for help.

LOGOUT-ENDFIL (Figure 1, page 6). The student had been at the terminal one hour and 32 minutes during this session and three hours and 22 minutes total. The computer would store her value weights; the list of occupations in SAVE; RANK, MATH, ENG, and ENGH (the record of her previous performance from the Prediction system); and her status, which was now 7. If she should return to SIGI at any time, she would go through a brief sign on and then to the menu.

```
DK2:[1,13]
              15:51          04-Jan-77

DATE    04-Dec-75
INTIN   12:01
STATUS   0    NOVICE.
INTR4    3    COMPLETED 1 OR MORE SEMESTERS.          ENROLLMENT.
INTR5    2    19-21                                   AGE.
INTR6    2    FEMALE.                                 SEX.
PRT1          PRINT SIGI OVERVIEW.
INTR7    2    GENERAL IDEA OF WHAT I WANT.            VALUES STATUS.
INTR8    3    NOT SURE THEY FIT MY VALUES.            OCCUPATION STATUS.
INTR9    2    PREDICT GRADES IN SOME PROGRAMS.        PREDICTION STATUS.
INTR10   2    GENERAL IDEA WHICH IS BEST.             PLANNING STATUS.
INTR11   1    EXAMINE YOUR VALUES.                    FIRST STEP.
VALIN   12:15
VAL2     1    MAIN FIELD OF INTEREST-CORRECT.         CAI IMPORTANT VALUES.
VAL3     1    SCIENTIFIC.                             FIRST TIME INTEREST FIELD.
END2    10    EARLY ENTRY.                            VALUE GAME JOB REJECTED.
         7    LEADERSHIP.                             VALUE GAME JOB REJECTED.
         5    SECURITY.                               VALUE GAME JOB ACCEPTED.
END5     1    INCOME.                                 VALUE GAME JOB ACCEPTED.
         5    SECURITY.                               VALUE GAME JOB REJECTED.
END2     2    PRESTIGE.                               VALUE GAME JOB REJECTED.
         3    INDEPENDENCE.                           VALUE GAME JOB REJECTED.
         4    HELPING OTHERS.                         VALUE GAME JOB REJECTED.
         6    VARIETY.                                VALUE GAME JOB REJECTED.
         8    INTEREST FIELD.                         VALUE GAME JOB REJECTED.
         9    LEISURE.                                VALUE GAME JOB REJECTED.
         1    INCOME.                                 VALUE GAME JOB ACCEPTED.
END5     7    LEADERSHIP.                             VALUE GAME JOB ACCEPTED.
         1    INCOME.                                 VALUE GAME JOB REJECTED.
INCON3   7    LEADERSHIP.                             JOB VALUE RATED LOWER.
         1    INCOME.                                 JOB VALUE IS INCONSISTENT.
END2     2    PRESTIGE.                               VALUE GAME JOB REJECTED.
         3    INDEPENDENCE.                           VALUE GAME JOB REJECTED.
         7    LEADERSHIP.                             VALUE GAME JOB REJECTED.
         9    LEISURE.                                VALUE GAME JOB REJECTED.
         1    INCOME.                                 VALUE GAME JOB ACCEPTED.
END5     8    INTEREST FIELD.                         VALUE GAME JOB ACCEPTED.
         1    INCOME.                                 VALUE GAME JOB REJECTED.
INCON3   8    INTEREST FIELD.                         JOB VALUE RATED LOWER.
         1    INCOME.                                 JOB VALUE IS INCONSISTENT.
VAL5     5    INCOME.
         4    PRESTIGE.
         1    INDEPENDENCE.
         4    HELPING OTHERS.
         5    SECURITY.
         3    VARIETY.
         2    LEADERSHIP.
         4    INTEREST FIELD.
         1    LEISURE.
         2    EARLY ENTRY.
VAL4     1    SCIENTIFIC.                             SECOND TIME INTEREST FIELD.
VAL6     7    INCOME.
         4    PRESTIGE.
         1    INDEPENDENCE.
         5    HELPING OTHERS.
         5    SECURITY.
         3    VARIETY.
```

Figure 1, Page 1. Printout of a student record.

```
        3    LEADERSHIP.
        7    INTEREST FIELD.
        3    LEISURE.
        2    EARLY ENTRY.
VAL7    3    OCCUPATION INFO. SEARCH-CORRECT.        CAI WHY KNOW VALUES.
VAL8    2    INDEPENDENCE-CORRECT.                   CAI IMPORTANT VALUES.
VAL9    3    AUTONOMIST-CORRECT.                     CAI JOB VALUE FIT.
VAL10   2    SATISFY YOUR VALUES-CORRECT.            CAI SECOND STEP.
LOCIN   12:59
LOC3    1    INCOME.                                 3    MORE THAN $11,000.
        6    INTEREST FIELD.                         1    SCIENTIFIC.
        4    HELPING OTHERS.                         2    AVERAGE AMOUNT.
        5    SECURITY.                               3    MORE THAN AVERAGE AMOUNT.
        2    PRESTIGE.                               2    AVERAGE AMOUNT.
LOC4    127 CIVIL ENGINEER.                    129 DENTIST                         132 DIETITIAN
        143 FORESTER                           145 HOME ECONOMIST                  149 INDUSTRIAL ENGINEER
        159 PHYSICIAN                          161 METEOROLOGIST                   177 PUBLIC HEALTH SPECIALITST.
        180 PHARMACIST.                        188 PSYCHOLOGIST.                   199 SOIL CONSERVATIONIST.
        205 SPEECH PATHOLOGIST/AUDIOLOGIST.    217 VETERINARIAN.                   243 PHYSICIAN'S ASSISTANT.
PRT2         PRINT OCCUPATION MEET SPECS.

LOC5    1    TOO MUCH EDUCATION REQUIRED.            LIMIT OF EDUCATION.
LOC6    1    WHY OCCUPATION FAILS.                   WHERE NEXT IN LOCATE.
LOC7    243 PHYSICIAN'S ASSISTANT.

LOC6    1    WHY OCCUPATION FAILS.                   WHERE NEXT IN LOCATE.
LOC7    193 NURSE, REGISTERED.
LOC8    1    SPECIFICATIONS DO NOT FIT.              TEST OCCUPATION FOR FIT.
        0    SPECIFICATIONS FIT.                     TEST OCCUPATION FOR FIT.
        0    SPECIFICATIONS FIT.                     TEST OCCUPATION FOR FIT.
        0    SPECIFICATIONS FIT.                     TEST OCCUPATION FOR FIT.
        0    SPECIFICATIONS FIT.                     TEST OCCUPATION FOR FIT.
PRT6         PRINT OCCUPATION FIT - NO FIT.
LOC6    2    CHANGE SPECIFICATIONS.                  WHERE NEXT IN LOCATE.
LOC3    1    INCOME.                                 2    MORE THAN $8,000.
        6    INTEREST FIELD.                         1    SCIENTIFIC.
        4    HELPING OTHERS.                         2    AVERAGE AMOUNT.
        5    SECURITY.                               3    MORE THAN AVERAGE AMOUNT.
        2    PRESTIGE.                               2    AVERAGE AMOUNT.
LOC4    127 CIVIL ENGINEER.                    129 DENTIST                         132 DIETITIAN
        143 FORESTER                           145 HOME ECONOMIST                  149 INDUSTRIAL ENGINEER
        159 PHYSICIAN                          161 METEOROLOGIST                   177 PUBLIC HEALTH SPECIALITST.
        180 PHARMACIST.                        188 PSYCHOLOGIST.                   193 NURSE, REGISTERED.
        199 SOIL CONSERVATIONIST.              205 SPEECH PATHOLOGIST/AUDIOLOGIST. 217 VETERINARIAN.
        221 TEACHER, BIOLOGY.                  227 TEACHER, MATHEMATICS.           229 TEACHER, PHYSICAL SCIENCE.
        243 PHYSICIAN'S ASSISTANT.
PRT2         PRINT OCCUPATION MEET SPECS.            WHERE NEXT IN LOCATE.
LOC6    4    MOVE OUT OF LOCATE.                     CAI NEXT DECISION STEP.
LOC9    2    GET MORE INFORMATION-CORRECT.
COMPIN  13:19
SAVE    127 CIVIL ENGINEER.                    129 DENTIST                         132 DIETITIAN
        143 FORESTER                           145 HOME ECONOMIST                  149 INDUSTRIAL ENGINEER
        159 PHYSICIAN                          161 METEOROLOGIST                   177 PUBLIC HEALTH SPECIALITST.
        180 PHARMACIST.                        188 PSYCHOLOGIST.                   193 NURSE, REGISTERED.
        199 SOIL CONSERVATIONIST.              205 SPEECH PATHOLOGIST/AUDIOLOGIST. 217 VETERINARIAN.
        221 TEACHER, BIOLOGY.                  227 TEACHER, MATHEMATICS.           229 TEACHER, PHYSICAL SCIENCE.
        243 PHYSICIAN'S ASSISTANT.
LOC2    193 NURSE, REGISTERED.               243 PHYSICIAN'S ASSISTANT.      177 PUBLIC HEALTH SPECIALITST.
COMP4   1    DEFINITION OF OCCUPATION?
PRT6         PRINT QUESTION & ANSWER FRAME.
```

Figure 1, page 2

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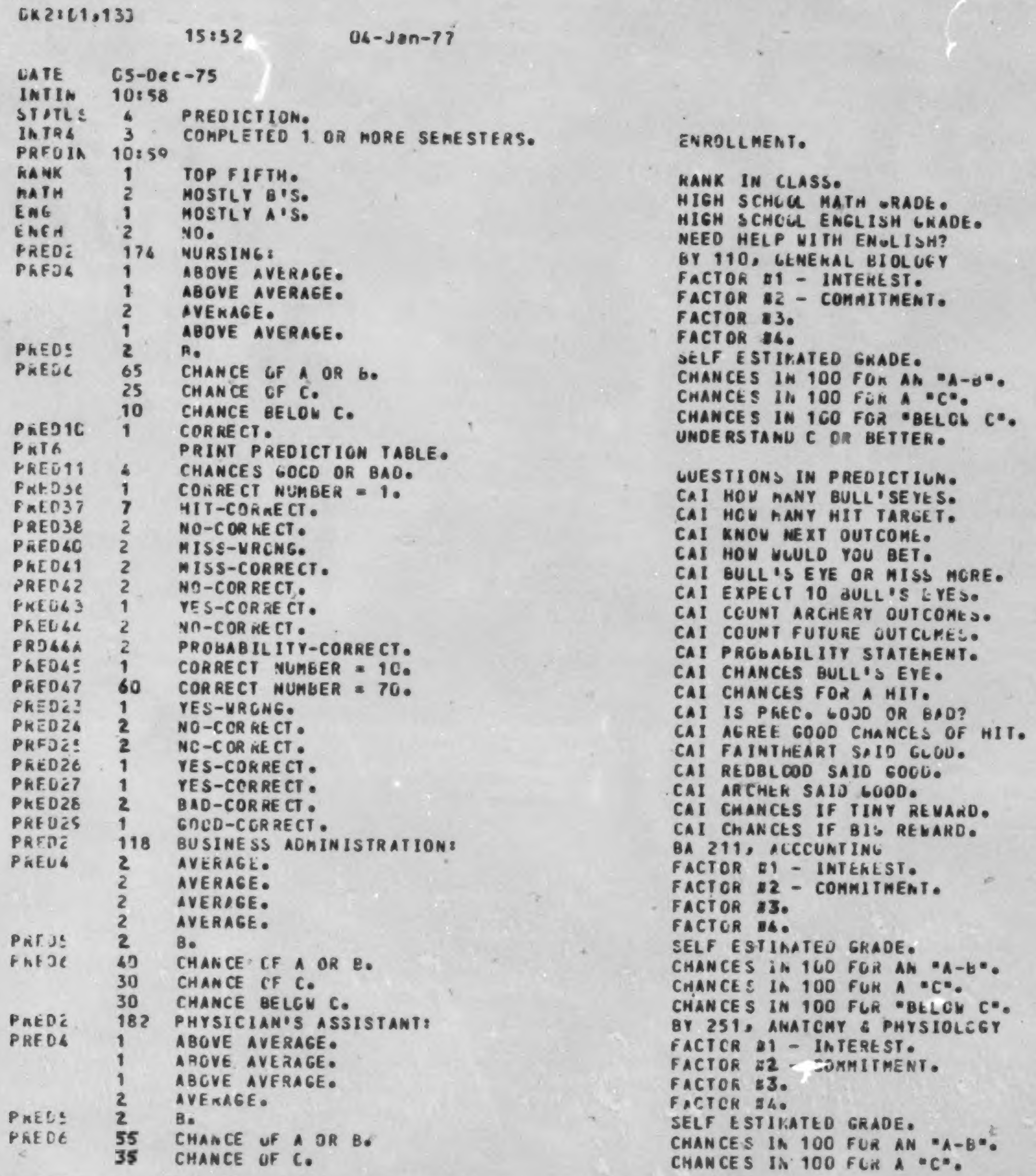
COMP4    2    DESCRIPTION OF WORK ACTIVITIES?
PRTS          PRINT QUESTION & ANSWER FRAME.
COMP4    4    WHERE TO GET MORE INFORMATION?
PRTS          PRINT QUESTION & ANSWER FRAME.
COMP4    8    PERSONAL QUALIFICATIONS?
         10   BEGINNING SALARY?
PRTS          PRINT QUESTION & ANSWER FRAME.
COMP4    11   AVERAGE INCOME-HIGH INCOME?
PRTS          PRINT QUESTION & ANSWER FRAME.
COMP4    12   TOP SALARY POSSIBILITIES?
         13   HOW SALARIES VARY?
         16   WHAT FIELDS OF INTEREST?
         27   ADVANCEMENT?
SAVE     127 CIVIL ENGINEER.                     129 DENTIST                            132 DIETITIAN
         163 FORESTER                            145 HOME ECONOMIST                     149 INDUSTRIAL ENGINEER
         159 PHYSICIAN                           161 METEOROLOGIST                      177 PUBLIC HEALTH SPECIALITST.
         180 PHARMACIST.                         188 PSYCHOLOGIST.                      193 NURSE, REGISTERED.
         199 SOIL CONSERVATIONIST.               205 SPEECH PATHOLOGIST/AUDIOLOGIST.    217 VETERINARIAN.
         221 TEACHER, BIOLOGY.                   227 TEACHER, MATHEMATICS.              229 TEACHER, PHYSICAL SCIENCE.
         243 PHYSICIAN'S ASSISTANT.
OCC2     193 NURSE, REGISTERED.               142 FLIGHT ATTENDANT                102 ADVERTISING COPYWRITER.
COMP4    1    DEFINITION OF OCCUPATION?
         11   AVERAGE INCOME-HIGH INCOME?
         23   FRINGE BENEFITS?
         7    RELATED COLLEGE COURSES?
         5    EDUCATION REQUIRED-EARLY ENTRY?
SAVE     102 ADVERTISING COPYWRITER.             127 CIVIL ENGINEER.                    129 DENTIST
         132 DIETITIAN                           142 FLIGHT ATTENDANT                   163 FORESTER
         145 HOME ECONOMIST                      149 INDUSTRIAL ENGINEER                159 PHYSICIAN
         161 METEOROLOGIST                       177 PUBLIC HEALTH SPECIALITST.         180 PHARMACIST.
         188 PSYCHOLOGIST.                       193 NURSE, REGISTERED.                 199 SOIL CONSERVATIONIST.
         205 SPEECH PATHOLOGIST/AUDIOLOGIST.     217 VETERINARIAN.                      221 TEACHER, BIOLOGY.
         227 TEACHER, MATHEMATICS.               229 TEACHER, PHYSICAL SCIENCE.         243 PHYSICIAN'S ASSISTANT.

OCC2     193 NURSE, REGISTERED.               175 PURCHASING AGENT.               201 SECRETARY.
COMP4    1    DEFINITION OF OCCUPATION?
         11   AVERAGE INCOME-HIGH INCOME?
         18   SPECIAL PROBLEMS?
         26   JOB SECURITY?
TRY1     4    SATISFACTIONS AND REWARDS.                CAI COMPARE 1ST STEP.
TRY2     6    OCCUPATION WHICH SATISFY VALUES.          CAI COMPARE 2ND STEP.
TRY3     1    GET LOTS OF INFORMATION.                  CAI COMPARE 3RD STEP.
TRY4     7    PREPARE FOR DIFERENT OCCS.                CAI COMPARE 4TH STEP.
         2    ESTIMATE CHANCES OF SUCCESS.              CAI COMPARE 4TH STEP.
TRY5     5    STATE EMPLOYMENT AGENCY.                  CAI COMPARE 5TH STEP.
         7    PREPARE FOR DIFERENT OCCS.                CAI COMPARE 5TH STEP.
LOGOUT  13:51
ENDFIL
```

Figure 1, page 3



```
DK2:[1,13]
             15:52          04-Jan-77

DATE     05-Dec-75
INTIM    10:58
STATUS    4     PREDICTION.
INTRA     3     COMPLETED 1 OR MORE SEMESTERS.           ENROLLMENT.
PREDIN   10:59
RANK      1     TOP FIFTH.                               RANK IN CLASS.
MATH      2     MOSTLY B'S.                              HIGH SCHOOL MATH GRADE.
ENG       1     MOSTLY A'S.                              HIGH SCHOOL ENGLISH GRADE.
ENGH      2     NO.                                      NEED HELP WITH ENGLISH?
PRED2     174   NURSING:                                 BY 110, GENERAL BIOLOGY
PRED4     1     ABOVE AVERAGE.                           FACTOR #1 - INTEREST.
          1     ABOVE AVERAGE.                           FACTOR #2 - COMMITMENT.
          2     AVERAGE.                                 FACTOR #3.
          1     ABOVE AVERAGE.                           FACTOR #4.
PRED5     2     B.                                       SELF ESTIMATED GRADE.
PRED6     65    CHANCE OF A OR B.                        CHANCES IN 100 FOR AN "A-B".
          25    CHANCE OF C.                             CHANCES IN 100 FOR A "C".
          10    CHANCE BELOW C.                          CHANCES IN 100 FOR "BELOW C".
PRED10    1     CORRECT.                                 UNDERSTAND C OR BETTER.
PRT6            PRINT PREDICTION TABLE.
PRED11    4     CHANCES GOOD OR BAD.                     QUESTIONS IN PREDICTION.
PRED36    1     CORRECT NUMBER = 1.                      CAI HOW MANY BULL'SEYES.
PRED37    7     HIT-CORRECT.                             CAI HOW MANY HIT TARGET.
PRED38    2     NO-CORRECT.                              CAI KNOW NEXT OUTCOME.
PRED40    2     MISS-WRONG.                              CAI HOW WOULD YOU BET.
PRED41    2     MISS-CORRECT.                            CAI BULL'S EYE OR MISS MORE.
PRED42    2     NO-CORRECT.                              CAI EXPECT 10 BULL'S EYES.
PRED43    1     YES-CORRECT.                             CAI COUNT ARCHERY OUTCOMES.
PRED44    2     NO-CORRECT.                              CAI COUNT FUTURE OUTCOMES.
PRD44A    2     PROBABILITY-CORRECT.                     CAI PROBABILITY STATEMENT.
PRED45    1     CORRECT NUMBER = 10.                     CAI CHANCES BULL'S EYE.
PRED47    60    CORRECT NUMBER = 70.                     CAI CHANCES FOR A HIT.
PRED23    1     YES-WRONG.                               CAI IS PREC. GOOD OR BAD?
PRED24    2     NO-CORRECT.                              CAI AGREE GOOD CHANCES OF HIT.
PRED25    2     NO-CORRECT.                              CAI FAINTHEART SAID GOOD.
PRED26    1     YES-CORRECT.                             CAI REDBLOOD SAID GOOD.
PRED27    1     YES-CORRECT.                             CAI ARCHER SAID GOOD.
PRED28    2     BAD-CORRECT.                             CAI CHANCES IF TINY REWARD.
PRED29    1     GOOD-CORRECT.                            CAI CHANCES IF BIG REWARD.
PRED2     118   BUSINESS ADMINISTRATION:                 BA 211, ACCOUNTING
PRED4     2     AVERAGE.                                 FACTOR #1 - INTEREST.
          2     AVERAGE.                                 FACTOR #2 - COMMITMENT.
          2     AVERAGE.                                 FACTOR #3.
          2     AVERAGE.                                 FACTOR #4.
PRED5     2     B.                                       SELF ESTIMATED GRADE.
PRED6     40    CHANCE OF A OR B.                        CHANCES IN 100 FOR AN "A-B".
          30    CHANCE OF C.                             CHANCES IN 100 FOR A "C".
          30    CHANCE BELOW C.                          CHANCES IN 100 FOR "BELOW C".
PRED2     182   PHYSICIAN'S ASSISTANT:                   BY 251, ANATOMY & PHYSIOLOGY
PRED4     1     ABOVE AVERAGE.                           FACTOR #1 - INTEREST.
          1     ABOVE AVERAGE.                           FACTOR #2 - COMMITMENT.
          1     ABOVE AVERAGE.                           FACTOR #3.
          2     AVERAGE.                                 FACTOR #4.
PRED5     2     B.                                       SELF ESTIMATED GRADE.
PRED6     55    CHANCE OF A OR B.                        CHANCES IN 100 FOR AN "A-B".
          35    CHANCE OF C.                             CHANCES IN 100 FOR A "C".
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Figure 1, page 4

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          10    CHANCE BELOW C.                         CHANCES IN 100 FOR "BELOW C".
PRED2     193   REGISTERED NURSING:                     BY 251, ANATOMY & PHYSIOLOGY
PRT6            PRINT PREDICTION TABLE.
PLNIN    11:27
SAVE      102 ADVERTISING COPYWRITER.         127 CIVIL ENGINEER.                  129 DENTIST
          132 DIETITIAN                       142 FLIGHT ATTENDANT                 143 FORESTER
          145 HOME ECONOMIST                  149 INDUSTRIAL ENGINEER              159 PHYSICIAN
          161 METEORCLOGIST                   175 PURCHASING AGENT.                177 PUBLIC HEALTH SPECIALITST.
          180 PHARMACIST.                     188 PSYCHOLOGIST.                    193 NURSE, REGISTERED.
          199 SOIL CONSERVATIONIST.           201 SECRETARY.                       205 SPEECH PATHOLOGIST/AUDIOLOGIST.
          217 VETERINARIAN.                   221 TEACHER, BIOLOGY.                227 TEACHER, MATHEMATICS.
          229 TEACHER, PHYSICAL SCIENCE.      243 PHYSICIAN'S ASSISTANT.
PLN2      201   SECRETARY.                          OCCUPATION TO BE PLANNED FOR.
PLN13     1     YES, I AM WILLING.                  WILLING-TERMINAL OCC?
PLN15     1     YES, I HAVE THE ABILITY.            ABILITY-TERMINAL OCC.
PLN3      2     PLAN FOR THIS OCCUPATION.           WANT TO SEE RISK DISPLAYS?
PLN23     2     NO.                                 FOLLOW THIS PROGRAM OF STUDY?
PLN21     2     NO, EDUCATION NO PROBLEM.           TOO MUCH EDUCATION.
SAVE      102 ADVERTISING COPYWRITER.         127 CIVIL ENGINEER.                  129 DENTIST
          132 DIETITIAN                       142 FLIGHT ATTENDANT                 143 FORESTER
          145 HOME ECONOMIST                  149 INDUSTRIAL ENGINEER              159 PHYSICIAN
          161 METEOROLOGIST                   175 PURCHASING AGENT.                177 PUBLIC HEALTH SPECIALITST.
          180 PHARMACIST.                     188 PSYCHOLOGIST.                    193 NURSE, REGISTERED.
          199 SOIL CONSERVATIONIST.           201 SECRETARY.                       205 SPEECH PATHOLOGIST/AUDIOLOGIST.
          217 VETERINARIAN.                   221 TEACHER, BIOLOGY.                227 TEACHER, MATHEMATICS.
          229 TEACHER, PHYSICAL SCIENCE.      243 PHYSICIAN'S ASSISTANT.
PLN2      193   NURSE, REGISTERED.                  OCCUPATION TO BE PLANNED FOR.
PLN12     2     TAKE THE 4 YEAR PROGRAM.
PLN10     1     YES, SPEND THE TIME.                WILLING-BACHELOR OCC?
PLN11     1     YES, I HAVE THE ABILITY.            ABILITY-BACHELOR OCC.
PLN3      1     SEE DISPLAYS.                       WANT TO SEE RISK DISPLAYS?
PLN4      1     PLAN FOR THIS OCCUPATION.           WHAT IS YOUR CHOICE?
PLN23     1     YES.                                FOLLOW THIS PROGRAM OF STUDY?
PLN24     1     YES.                                COMPLETE PREREQUISITES.
PLN25     1     YES, SEE THE INFORMATION.           FINANCIAL AID INFORMATION?
PLN19     2     NO, CONTINUE.                       SEE THE 2 YEAR PROGRAM?
STRIN    11:52
STR3      1     VALUES ARE IMPORTANT-CORRECT.       CAI BEGIN DECISION MAKING.
STR4      2     HOW CAR FITS VALUES-CORRECT         CAI WHAT SHOULD YOU DO NEXT?
STR5      1     RATES MORE ON PERFORM.-CORRECT.     CAI PERFORMANCE OR PRICE?
STR6      1     WEIGHT TIMES RATING-CORRRECT.       CAI VALUE X RATING OR 1 VALUE?
STR7      2     SUM PRODUCTS FOR CAR CORRECT-C      CAI FINISH THE THOUGHT.
STR8      2     NO-CORRECT.                         CAI IS THRUST BEST FOR ALL?
STR9      1     YES-CORRECT.                        CAI FIT VALUES OF A 3RD PERSON?
STR10     1     DIFFERENT RATINGS-WRONG.            CAI WHY SUMS DIFFER.
STR11     1     SEE VALUE WEIGHTS.                  DO YOU WANT TO REVIEW WEIGHTS?
VAL5      7     INCOME.
          4     PRESTIGE.
          1     INDEPENDENCE.
          5     HELPING OTHERS.
          5     SECURITY.
          3     VARIETY.
          3     LEADERSHIP.
          7     INTEREST FIELD.
          3     LEISURE.
          2     EARLY ENTRY.
VAL6      6     INCOME.
          4     PRESTIGE.
          1     INDEPENDENCE.
                HELPING OTHERS.
```

Figure 1, page 5

```
        5  . SECURITY.
        3    VARIETY.
        3    LEADERSHIP.
        8    INTEREST FIELD.
        3    LEISURE.
        2    EARLY ENTRY.
SAVE    102 ADVERTISING COPYWRITER.          127 CIVIL ENGINEER.                   129 DENTIST
        132 DIETITIAN                        142 FLIGHT ATTENDANT                  143 FORESTER
        145 HOME ECONOMIST                   149 INDUSTRIAL ENGINEER               159 PHYSICIAN
        161 METEOROLOGIST                    175 PURCHASING AGENT.                 177 PUBLIC HEALTH SPECIALITST.
        180 PHARMACIST.                      188 PSYCHOLOGIST.                     193 NURSE, REGISTERED.
        199 SOIL CONSERVATIONIST.            201 SECRETARY.                        205 SPEECH PATHOLOGIST/AUDIOLOCIST.
        217 VETERINARIAN.                    221 TEACHER, BIOLOGY.                 227 TEACHER, MATHEMATICS.
        229 TEACHER, PHYSICAL SCIENCE.       243 PHYSICIAN'S ASSISTANT.
STR12   243  PHYSICIAN'S ASSISTANT.                 OCCUPATION-FIRST CHOICE.
STR14   193 NURSE, REGISTERED.             124      OCCUPATION WEIGHTED VALUES.
        243 PHYSICIAN'S ASSISTANT.         118      OCCUPATION WEIGHTED VALUES.
        175 PURCHASING AGENT.              80       OCCUPATION WEIGHTED VALUES.
STR16   1    YES-WRONG.                             CAI GO FOR IMPOSSIBLE OCC.
STR17   2    NO-CORRECT.                            CAI CHOOSE LEAST DESIRABLE OCC.
STR18   1    ARTICIAN 168-CORRECT.                  CAI OCCUPATION-GREATEST REWARD.
STR19   1    ARTICIAN 1 CHANCE-CORRECT.             CAI OCCUPATION-MOST RISK.
STR20   2    NO-WRONG.                              CAI BEST REWARD AND LEAST RISK.
STR21   2    2-CORRECT.                             CAI WHICH ONE WOULD YOU CHOOSE?
STR22   1    YES-WRONG.                             CAI RULE 62 WORK.
STR26   1    YES.                                   READY TO ESTIMATE?
        1    YES.                                   READY TO ESTIMATE?
        1    YES.                                   READY TO ESTIMATE?
STR23   193 NURSE, REGISTERED.             88       EST. CHANCES FOR ENTERING OCC.
        243 PHYSICIAN'S ASSISTANT.         75       EST. CHANCES FOR ENTERING OCC.
        175 PURCHASING AGENT.              50       EST. CHANCES FOR ENTERING OCC.
STR24   193  NURSE, REGISTERED.                     NOW I WOULD SELECT THIS OCC.
PRT12        PRINT FIRST CHOICE OCCUPATION.
STR25   2    NO, SKIP THIS INFORMATION.             WHAT PREDICTIONS TO ASK FOR.
EXIN    12:26
EX2     2    VALUES.                                WHAT TO DO NEXT?
VALIN   12:27
VAL5    6    INCOME.
        4    PRESTIGE.
        1    INDEPENDENCE.
        5    HELPING OTHERS.
        5    SECURITY.
        3    VARIETY.
        3    LEADERSHIP.
        8    INTEREST FIELD.
        3    LEISURE.
        2    EARLY ENTRY.
VAL6    6    INCOME.
        4    PRESTIGE.
        1    INDEPENDENCE.
        5    HELPING OTHERS.
        5    SECURITY.
        3    VARIETY.
        3    LEADERSHIP.
        8    INTEREST FIELD.
        3    LEISURE.
        2    EARLY ENTRY.
EXIN    12:29
EX2     1    SIGN OFF.                              WHAT TO DO NEXT?
SO2     1    YES, SEE THE DISPLAY.                  DISPLAY OF OCCS. NOT IN SIGI.
LOGOUT  12:30
ENDFIL
```

Figure 1, page 6

```
DEFINITION AND DESCRIPTION                   PERSONAL SATISFACTIONS
(1)  Definition of occupation?               (14)  Help others:  Chances to help?
(2)  Description of work activities?         (15)  Leadership:  Chances to lead?
(3)  Level of skill in interacting           (16)  Interest Field:  Which field?
       with data, people, things?            (17)  Prestige level?
(4)  Where to get more information?          (18)  Special problems?

EDUCATION, TRAINING, OTHER REQUIREMENTS      CONDITIONS OF WORK
(5)  Early Entry:  Education required?       (19)  Physical surroundings?
(6)  Specific occupational training?         (20)  Leisure:  hours, vacation?
(7)  Examples of college courses?            (21)  Independence on the job?
(8)  Personal qualifications?                (22)  Variety?
(9)  Other requirements?                     (23)  Fringe benefits?

INCOME (National figures)                    OPPORTUNITIES AND OUTLOOK
(10)  Beginning salary?                      (24)  National employment outlook?
(11)  Average income?  (Shows the mid-       (25)  Where are the jobs (U.S.)?
        point of salaries nationwide)        (26)  Security in the occupation?
(12)  Top salary possibilities?              (27)  Advancement?
(13)  How salaries vary?                     (28)  How many women?

You can pick 5 questions at a time.  Press the number of your first question.
The number you select will be repeated here so that you can check it:
If you make a mistake, press RUBOUT and start over.  When finished, press NEXT.
```

Figure 2. Questions the student can ask in Compare.

DEFINITION OF OCCUPATION?

175 Purchasing Agent

Purchases materials, supplies, services, and equipment for a company.

193 Nurse, Registered

A professional nurse (RN) administers nursing care to patients following a doctor's instructions. May supervise licensed practical nurses, aides and orderlies. May work in a hospital, nursing home, on private duty, or as a public health, school or industrial nurse.

243 Physician's Assistant

Assumes many tasks once performed only by the physician. Works under supervision of licensed physician to extend medical services. May specialize in surgery, pediatrics, family or internal medicine, etc.

For a copy of this information, press PRINT; otherwise press NEXT.

Figure 3. An answer to a question in Compare.

NURSING: BY 110, General Biology

PAST PERFORMANCE: Class rank: First fifth

Math grade: B

English grade: A

Need help with English: No

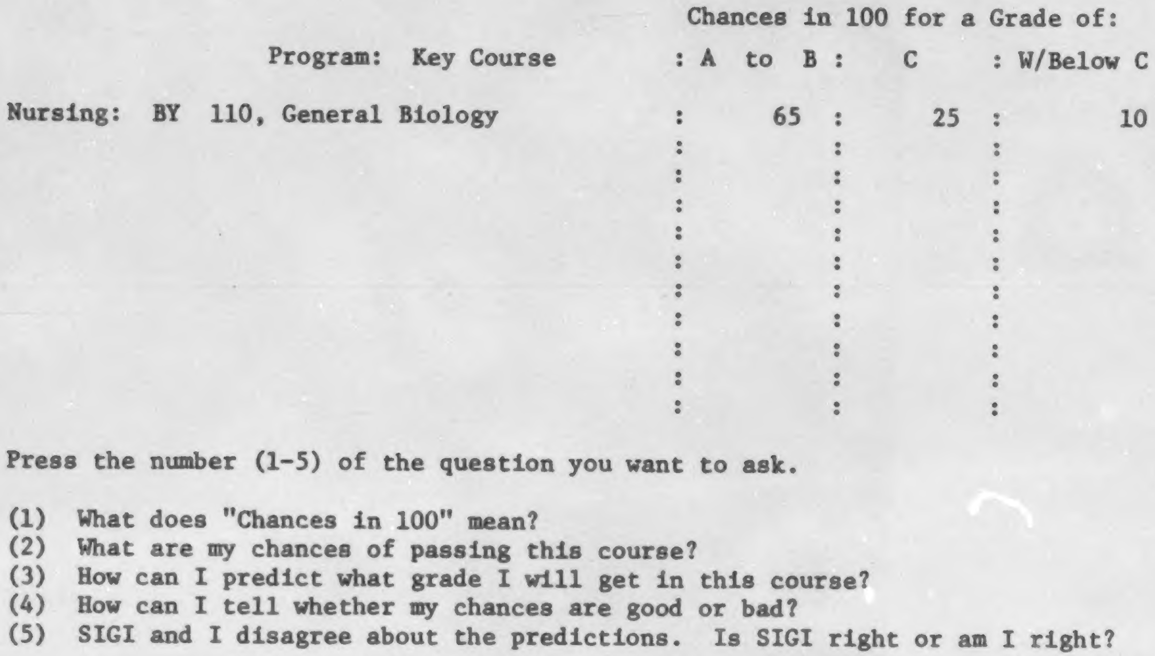
GRADE FACTORS:	(1) Above average	(2) Average	(3) Below average
Interest in subject area	X		
Commitment to program	X		
Third factor		X	
Fourth factor	X		

PERCENT OF PREVIOUS STUDENTS RECEIVING VARIOUS GRADES:

Grade	Percent of students receiving grade
GROUP (1) A+, A, A-	********** (22%)
GROUP (2) B+, B, B-	************* (28%)
GROUP (3) C+, C, C-	************** (30%)
GROUP (4) W/Below C	********* (20%)

Which GROUP (1-4) do you think your grade will be in? Press that number.

Figure 4. Display that the student uses as the basis for estimating her grade.



```
                                                   Chances in 100 for a Grade of:
                    Program:  Key Course          : A  to  B :     C      : W/Below C

Nursing:  BY  110, General Biology                :      65  :      25    :        10
                                                  :          :            :
                                                  :          :            :
                                                  :          :            :
                                                  :          :            :
                                                  :          :            :
                                                  :          :            :
                                                  :          :            :
                                                  :          :            :
                                                  :          :            :
                                                  :          :            :

Press the number (1-5) of the question you want to ask.

(1)  What does "Chances in 100" mean?
(2)  What are my chances of passing this course?
(3)  How can I predict what grade I will get in this course?
(4)  How can I tell whether my chances are good or bad?
(5)  SIGI and I disagree about the predictions.  Is SIGI right or am I right?
```

Figure 5. Questions the student may ask about predictions.

201 SECRETARY

You do not have to go to college to become a secretary. Better jobs are easier to get, however, if you have received the Associate degree. For best preparation, you should:

1. Enroll in the secretarial studies program at a community college.
2. Try to get a summer or part-time job in an office so that you gain experience in typing, stenography, and office practice.
3. Make sure you fulfill requirements for the Associate degree.

For a copy press PRINT; otherwise press NEXT.

Figure 6. Planning system display summarizing a path to entry into an occupation.

201 SECRETARY

High School Prerequisites for This Program

There are no prerequisites for admission to this program at Santa Fe Community College. It would be helpful to the student if he/she had completed courses in typing, shorthand, office machines, English and speech before entering the program, but such courses are not absolutely necessary.

If there are prerequisites for this program and you have not completed them, you may not be allowed to take some of the courses in your program of study. You will have to take lower level courses first, and this will put you behind schedule. You can:

1. Get back on schedule by making up work in summer school.
2. Take longer to graduate.
3. Get back on schedule by taking extra courses during a semester.

Each case is different. SEE YOUR COLLEGE COUNSELOR OR COLLEGE ADVISER.

You will want a copy of this information. Press PRINT.

Figure 7. Planning system display showing prerequisites for admission into a program at the student's college.

201 SECRETARY

A suggested Secretarial program includes:

6 sem. hrs. Communic./Humanities

6 sem. hrs. Math/Science

MS 190 Business Math
Math/Science Elective

6 sem. hrs. Social/Behavioral Sci.

ES 110 Basic Economics
Social/Behavioral Science Elect.

Completion of the following courses:

BA	101	Intro. to Business
BA	102	Basic Business Writing OR
EH	111	Lab in Communication Skills
BA	120	Elementary Typewriting
BA	121	Intermediate Typewriting
BA	130	Elementary Shorthand I
BA	131	Elementary Shorthand II
BA	132	Dictation & Transcription I
BA	140	Office Machines
BA	160	Basic Accounting I

BA	220	Adv. Typewriting
BA	230	Dictation & Transcription II
BA	111	Intro. to Data Processing OR
BA	240	Prin. of Management
BA	225	Prof. Typewriting
BA	232	Machine Transcription
BA	231	Secretarial Procedures
BA	270	Business Law

For a copy press PRINT.

Figure 8. Planning system display showing the courses recommended by the student's college as preparation for an occupation.

	VALUE	WT.	OCCUPATION					
			RN		PhyAst		PurAgt	
(1)	High Income	6	3	18	3	18	4	24
(2)	Prestige	4	3	12	3	12	2	8
(3)	Independence	1	2	2	2	2	3	3
(4)	Help Others	5	4	20	4	20	1	5
(5)	Security	5	3	15	3	15	2	10
(6)	Variety	3	3	9	3	9	2	6
(7)	Leadership	3	3	9	3	9	2	6
(8)	Interest Field	8	3	24	3	24	1	8
(9)	Leisure	3	3	9	1	3	2	6
(10)	Early Entry	2	3	6	3	6	2	4
		SUM =		124		118		80

Your weight for Income (6) x the rating of RN On Income (3) = 18, etc.

The sum of the products appears at the bottom of each column.
The occupation with the highest sum is probably the one that would fit your values best. The highest possible sum is 168; the lowest is 40.
In general, a difference of 10 points or more between sums is significant.

You will want a copy of this chart. Press PRINT.

Figure 9. Desirability Sums computed in Strategy.

What do you want to do next?

(1) Sign off.

(2) Go to VALUES and examine your Values again.

(3) Go to LOCATE and look for occupations that fit your Values.

(4) Go to COMPARE and ask questions about occupations.

(5) Go to PREDICTION and get probabilities of success in key courses for various programs of study.

(6) Go to PLANNING and plan how to prepare for various occupations.

(7) Go to STRATEGY and see which occupations fit your Values best and also learn a method of choosing an occupation.

Figure 10. Menu (called "EXIT") that allows the initiate to move at will among the SIGI subsystems.

CHAPTER III

SELECTION OF OCCUPATIONS AND SOURCES OF DATA FOR SIGI

The previous chapter showed a student encountering numerous values, occupations, and information. What principles did we follow in selecting these values? How did we choose occupations for inclusion in SIGI? What were our sources of information? How do we maintain its quality?

This chapter discusses these aspects of SIGI.

Selection of the Values Dimensions

The ten values selected for use in SIGI are High Income, Prestige, Independence, Helping Others, Security, Variety, Leadership, Work in a Particular Field of Interest, Leisure, and Early Entry. Where did these ten value dimensions come from, and why did we settle on them?

We did a number of studies of our own, and of course took into account the research of others. For example, we asked students, in structured interviews, a series of questions designed to elicit the dimensions along which they construed occupations. We asked them to tell us what they knew about an occupation of interest to them, and to indicate what other information they would like to have; what appealed to them most about it, and what least; what events or additional information might make them change their preference for that occupation; what characteristics an "ideal" or "dream" occupation would have, and also a "nightmare" occupation--the worst they could imagine. In a simulated occupational choice procedure, we gave students an opportunity to ask us questions about a set of unknown occupations; from the information we gave them, they would choose one as most attractive. Classifications of their questions and their evaluations of the occupations in light of the information they received gave us an additional check on the comprehensiveness and relevance of our values dimensions. In a variation on Kelly's REP test (Kelly, 1955), we gave them triads of occupations, asking them to indicate which two of the three seemed to offer satisfactions and rewards that were more nearly alike than the satisfactions and rewards offered by the third one. From their responses we were able to determine the dimensions along which they construed similarities and differences in occupational satisfactions.

In addition, as part of a questionnaire follow-up of a large national sample of secondary school students one year after completion of high school (Norris & Katz, 1970), we asked them to weight the importance of some dozen values dimensions; we computed the intercorrelations among the weights, and did an unrestricted maximum likelihood factor analysis of the intercorrelation matrix. (We also put into the matrix aptitude and interest scores, and found that the three domains--aptitudes, interests, and values--were independent.)

Despite all this research, we are sure there will not be universal agreement with some of our omissions. For example, we decided that we could not formulate a good enough operational definition of Creativity for this purpose. And a value called Sense of Accomplishment, or Pride in Work, did not seem useful in differentiating between occupations of concern to community college students (although it might differentiate between specific jobs or positions within an occupation and clearly differentiated between many unskilled and higher-level occupations). Incidentally, in the pilot study we found that students do perceive the dimensions as independent (intercorrelations of the weights tend to be quite low), each of the values is regarded as important by many students (as indicated by the mean weights), the weight given each value varies greatly across students (as indicated by the standard deviations of the weights), and students did not feel that values of importance to them had been omitted (as determined by interviews after their use of SIGI) (Chapman, Norris, and Katz, 1973).

The inclusion of Interest Field as one of the values dimensions may be a bit confusing. This value is defined in terms of the importance to the individual of working in a field in which the activities are of primary intrinsic interest rather than in some other field. The student indicates his preferred interest field from six options, each defined and illustrated: Scientific, Technological, Administrative, Personal Contact, Verbal, and Aesthetic. The designation of these six areas obviously takes cognizance of the massive body of research on interest measurement and dimensions of occupational interests.

Occupations in SIGI

Number of Occupations

At the completion of the field tests, there were 155 occupational descriptions in SIGI. If the reader will look at Appendix B of this report, Occupational Information in SIGI: A Handbook for Data Collection, Interpretation, Preparation, and Documentation, and then will turn to Appendixes A and B of that Appendix, he will find an alphabetic list and a numerical list of these occupations.

The 155 descriptions actually cover 224 occupations because some descriptions include two distinct occupations (e.g., Interpreter/Translator); others include (a) information on one or more suboccupations, (b) higher or lower levels of the general occupation, or (c) specialties within an occupation. For example, Court Reporter (a specialty) is described in the information for Stenographer; Rodman and Chainman (lower levels) are described in the information for Surveyor. Students find the suboccupations through the cross-reference list attached to the SIGI terminals. It is reproduced on pages 115-117 of Appendix C of the handbook, Occupational Information in SIGI. How were the occupations selected for SIGI?

Selection of Occupations

Since SIGI was designed for use by students at both two-year and four-year colleges, the occupations were selected primarily on the basis of their appeal to that population. The amount of education beyond high school required for entry ranges from none to graduation from professional school; most require some college credentials.

A small sample of two-year and four-year colleges was polled by the ETS staff in order to select occupations for SIGI. In addition, occupational titles from the Occupational Outlook Handbook, the Dictionary of Occupational Titles, the California Occupational Guide Series, surveys of occupations entered by college students, and other sources were considered. We also reviewed college catalogs to find out whether they already had programs that prepared students for particular occupations. To the extent possible we try to include occupations for which the SIGI colleges, actual and prospective, have preparatory programs.

Our staff is small and we do not have means to add occupations in wholesale lots. Therefore we have established priorities among the candidate occupations for inclusion in SIGI. Priorities were determined mainly by the extent of demand among the colleges we polled, but we also followed general guidelines. A potential occupation might be excluded for a number of reasons, as follows:

1. It is a military occupation. The military tends to comprise a distinct occupational system of its own with its own titles, specialties, opportunities for advancement, salaries, and educational facilities.

2. The occupation is of more interest to the high school population than to the college population.

3. The occupation is so specialized that the number of workers is small.

4. The occupation has the same values profile as an existing SIGI occupation and is best treated as part of the broader category (e.g., Civil Engineering Aide is treated under Engineering Technician).

5. The occupation is highly visible and is one that requires the very early development of specialized rare talents (e.g., Professional Athlete).

6. The occupational title is too broad to be useful.

7. The occupation is not an "entry level" occupation (e.g., Judge, entered from Lawyer).

8. The occupation is a specialty of a more general occupation in SIGI for which the specialized preparation takes place in graduate school (e.g., the various specialties of physicians, college teachers, etc.)

9. The occupation is too new and its outlook too uncertain to warrant its inclusion now (e.g., Nuclear Technician).

10. The title is that of a job rather than an occupation (e.g., Financial Analyst).

11. Valid information about the occupation is almost impossible to get.

Occupational Information

Occupational information is organized as answers to the 28 questions the student can ask in the Compare system. Figure 2 of Chapter II reproduces the display containing the questions. There are also two other classes of occupational information, the Planning system display (called the "occupational overview" in this report) outlining the steps the student should follow as preparation for work in the occupation, and the rating assigned to each of the ten value dimensions of each occupation. The ratings are used in Locate to retrieve occupations and in Strategy to compute Desirability Sums. Where does all this information come from?

Answers to the 28 Questions

Occupational information is gleaned from many different sources. It is obviously not feasible to list all the sources here. Instead, we refer the reader to Occupational Information in SIGI, which is Appendix B. This handbook presents in detail the sources we consult and the procedures we employ in working up new occupations and in updating existing ones. Here we will touch on these matters briefly.

Our major sources are the standard publications of the U. S. Bureau of Labor Statistics: The Occupational Outlook Handbook (OOH), the Dictionary of Occupational Titles (DOT), Manpower Magazine, Monthly Labor Review, and Occupational Outlook Quarterly. We also refer to over 30 journals and periodicals, to materials produced by the principal publishers of occupational information, to newspaper and magazine articles, to monographs and sociological studies, to books and reports, to state and federal government agencies, and (with great frequency) to professional organizations, to unions, to workers in the occupation.

Like other workers in the field, we are plagued by untrustworthy, obsolete, and conflicting information. As a result, we have come to rely more and more on procedures for treating information. They consist of (a) research, (b) write-up, (c) review for correction and verification by two reviewers with knowledge of the occupation (e.g., union officials, officers of professional organizations), (d) entry into the computer.

This bare outline does not convey the amount of telephoning, letter-writing, and staff discussion that goes into the process. A single item of information may have been synthesized from several sources. The source of each statement that appears on the SIGI screen is documented on 3 x 5 cards in the SIGI library.

The Occupational Overview for the Planning System

The overview of the step-by-step preparation for entry into an occupation, which students see in the Planning and Strategy systems (Chapter II, Figure 6), comes mainly from the information that answers the questions about required education, occupational training, and other requirements (Figure 2, questions 5, 6, and 9). For many occupations, however, the overview presents a special problem, for there may be more than one path to entry, or there may be no well-defined path, or there may be disagreement as to the best strategy of preparation.

As with the treatment of occupational information, we rely on rigorous procedures to reduce our dependence on arbitrary judgments. If more than one path to entry exists, we include all reasonable options. We do not urge the student to enroll in college unless a college program offers the best preparation, nor do we urge students to pick up unnecessary degrees.

Information in the overview is documented and reviewed with the rest of the occupational information.

The process of preparing the overviews is discussed in detail on pages 63-66 of Occupational Information in SIGI (Appendix B of this report).

Updating

A significant portion of our effort with respect to occupational information goes to keeping it current. Occupational information does not age well, especially salary data. For this reason, the answers to the four questions about salary (beginning, average, top, and variability) are reviewed annually. All occupational information is reviewed every two years when the new edition of the OOH is received, with special emphasis on outlook, security, proportion of women, licensing-certification requirements, and sources of additional information. The updated information comes from the same kinds of sources and is treated in the same way as the original information.

Updated information is distributed to the SIGI users once a year. It is entered onto the computer disks at ETS. The disks are then copied and sent to the users, who install them and return the outdated disks. The users do not have to enter the new information themselves. If the user hardware consists of the RPO disk, the updated version of SIGI is copied onto tape and distributed in that form.

Ratings of Occupations on the Values Dimensions

Each occupation is rated on each of the ten SIGI values. An occupation's rating on a value is an indication of how well the occupation provides opportunity to satisfy the value. For all values except High Income the scale runs from 4 (maximum opportunity) to 1 (minimum opportunity); for High Income, the scale runs from 5 to 1. There are six ratings on Interest Field for each occupation showing the extent to which the major activities lie in each of the six fields. No occupation is rated 0 on any value, since all occupations are judged to offer some opportunity to satisfy a given value.

Method

Our method of determining ratings is fully described in Occupational Information in SIGI (Appendix B of this report). A summary of the procedures follow:

1. Each of the four (for High Income, five) categories of rating has been defined. The definitions appear in Exhibits II-6 through II-15 (pp.75-86 of Appendix B). The definitions have been distilled from our experience with increasing numbers of occupations over a long period of time. Figure 11,

reproduced from the handbook, will serve as an illustration.

2. The SIGI research staff assesses the relevant occupational information in light of the definitions. At least two staff members make independent ratings, deciding which category fits the majority of workers in the field. If the raters disagree, more research and additional consultation are instigated until a consensus is reached.

3. The occupational ratings are articulated with the answers to the corresponding questions in Compare so that, for example, a student asking question number 20, "Independence on the job?" would get a verbal description equivalent to the definition of the category in which the rating fell.

Sources of Information for the Ratings

Ratings for four of the values can in most instances be determined from hard data: Early Entry (years of preparatory education), Income (median salary), Leisure (hours of work, vacation time), and Interest Field. Ratings for Prestige are based on the dissertation of Paul M. Siegel (1971) of the University of Michigan Population Studies Center. It was only necessary to establish points on Siegel's scale to define the boundaries of the four SIGI categories. Most SIGI occupations appear on Siegel's list; those that do not entail composite ratings.

The remaining values require higher levels of inference: Helping Others, Leadership, Independence, Variety, and Security. Useful sources of data for these values are the DOT, which assigns numerical ratings on Independence, Variety, and Leadership; the OOH and other career guides, which often discuss Leadership and Variety; and specific questions directed to people informed about the work activities in the occupation.

Table 1 shows how the ratings were distributed with respect to the 155 occupations in SIGI at the end of the field test. The value Interest Field has been broken into its six components. It may be noted that no attempt has been made to force the ratings into a normal distribution. For some of the values dimensions, the bulk of the occupations are rated at 2 or 3 with fewer rated at 1 and 4, but even these are not distributed symmetrically. Given the SIGI definitions of the ten values, the table reflects the actual structure of the occupations as they exist today.

Insert Table 1 about here

Information for the Prediction System

The regression equations that produce the "predictions" (actually, they are probability statements) that the student sees are computed at ETS from data supplied by the college. The forms and procedures that the college must use are described in Appendix A, the Prediction System Manual. They will be summarized here.

1. The college identifies a "key course" for each of its programs of study in accordance with as many of the following guidelines as it can adhere to: (a) it is a required course in the program; (b) the course comes early in the sequence of courses that constitute a program; (c) it tends to differentiate students who do well in the program from those who do poorly; (d) the coursework is highly relevant to the program; and (e) the coursework is representative of the entire program. A key course may serve more than one program. The list of programs and their key courses is transmitted to ETS on Form A of the Prediction system forms (Appendix A).

2. The college fills out a Request Sheet, which is an estimate of the number of students enrolled in each key course, and sends it to ETS.

3. Instructors of the key courses or other appropriate persons at the college identify the Grade Factors for each course. One of these, Commitment to the Program, is always the same. Another, Interest in the Subject Area, requires the college to describe the content and activities of the

course. The other two factors are either selected from a menu of 29 potential factors or are made up ad hoc. This information is returned to ETS on Form B (Appendix A).

4. For each key course, the college prepares a table showing the distribution of grades during the recent past. This information is transmitted to ETS on Form C (Appendix A).

5. For each key course, the college prepares a Student Questionnaire and prints enough copies for every student taking the course. The questionnaires gather the same information about the students as the SIGI Prediction system gathers with respect to age, sex, enrollment status, previous performance, self-ratings on the grade factors, and estimated grade. (See Student Questionnaire and Answer Sheet, Appendix A.) Each questionnaire is accompanied by information about the criterion (final grade)--the four grade factors and the distribution of previous grades. The college administers the questionnaire on the first day of a new term.

6. If the college has a mandatory testing program, it enters the student's test scores on his questionnaire.

7. At the end of the term, the college adds to each questionnaire the student's grade in the course and mails the questionnaires to ETS.

8. ETS does the statistical analysis that results in the regression equations that are stored in the unique version of the SIGI Prediction system used by the college.

We have, of course, developed safeguards to protect the integrity of the predictions the students receive. Anyone who reads the Prediction System Manual will be struck by the amount of interchange that goes on between ETS and the college and by the procedures we have adopted to review the input of the college Also, we follow guidelines to enhance the accuracy of the predictions. If the sample size falls below 50 in a key course, data are collected for more than one term. If a multiple R of .40 or larger cannot be obtained using the best combination of two or three predictor variables, the course is judged to be unpredictable as far as SIGI is concerned. Finally, only predictor variables are used that have a logical relation with the criterion; sex is not used at all, even though it sometimes correlates moderately well with final grade, and age was used in only one instance in a course with an older student population.

Information for the Planning System

Information for the Generalized Portion

There are three classes of information that all students are exposed to in the Planning system regardless of the existence or absence of displays with local information. These are (a) the information the student uses to decide whether or not he has the ability successfully to prepare for an occupation, (b) the classification of the occupation as PROF, GRAD, and so on (Chapter II, page 29), and (c) the occupational overview.

The first of these is the answer to question number 7 in Compare, "Examples of college courses?" That display is simply inserted into a master frame that supplies appropriate text.

The second, the classification, is derived from the same sources as the answers to questions about education, and the classification is related to the rating of the occupation on Early Entry. The researchers classify the occupation at the same time as they process other information about it. (See Appendix B, Exhibit II-6.)

The third, the occupational overview, has already been discussed in this chapter, page 75 *supra*.

Information for the Individualized Portion

All the field-test colleges have expanded the generalized Planning system to include the information about the local programs that the college recommends as preparation for the various occupations. Displays for this portion of the Planning system consist of (a) the courses that the student should take at his college as preparation for each occupation; (b) the prerequisites, in terms of high school courses, for admission into those courses; (c) transfer institutions or graduate schools where the student can go to complete the preparation begun at his college; (d) if the local college does not offer an appropriate program for preparation for the occupation, a list of nearby institutions that do offer such programs; and (e) a series of five displays identifying the main sources of financial aid and telling the student whom to see for details. All of this information is prepared by the local college itself. We simply enter it into the computer system.

In preparing their displays, the colleges must follow certain rigid instructions with regard to formats and the sequencing of displays. The colleges also need information about the occupation so that the college will have some basis for deciding which of its programs will serve best. The vehicle for communicating the instructions and supplying the information is the Planning System Manual.

The manual is reproduced as Appendix C. (In order to conserve space, we omit all but a few examples of the information about occupations.) The information about the occupations consists of the overviews just as they appear in SIGI, the classification of the occupation (PROF, GRAD, and so on), and, where appropriate, supplementary information that we acquired in our research on the occupation. Figure 12 reproduces this information for occupation number 102 Advertising Copywriter.

Table 1

Distribution of Ratings

Value	Rating	No. of occs.	Value	Rating	No. of occs.
Income	5	16	Early Entry	4	60
	4	35		3	26
	3	59		2	51
	2	33		1	18
	1	12	Scientific Interest	4	43
Prestige	4	25		3	13
	3	64		2	5
	2	36		1	94
	1	30	Technological Interest	4	38
Independence	4	27		3	10
	3	70		2	11
	2	37		1	96
	1	21	Administrative Interest	4	24
Helping Others	4	40		3	9
	3	26		2	4
	2	36		1	118
	1	53	Personal Contact Int.	4	52
Security	4	32		3	10
	3	58		2	7
	2	38		1	86
	1	27	Verbal Interest	4	21
Variety	4	50		3	3
	3	49		2	6
	2	42		1	125
	1	14	Aesthetic Interest	4	16
Leadership	4	29		3	2
	3	29		2	1
	2	51		1	136
	1	46			
Leisure	4	23			
	3	38			
	2	59			
	1	35			

EXHIBIT II-13

DEFINITION AND RATING CATEGORIES FOR INDEPENDENCE

Definition of Value

INDEPENDENCE: Some occupations give you more freedom than others to make your own decisions, to work without supervision or direction from others. At one extreme might be talented free-lance artists or writers who may work without supervision. At the other extreme might be military service or some big business organizations with chains of command which severely limit the decisions that each person can make.

The four categories correspond to different frequencies of evaluation and supervision.

Definition of Category

Rating	
4	A great amount (Rare supervision): Responsible to someone else only in extraordinary circumstances. Self-employed or top management level or professional (doctorate highly recommended). Decides what work needs to be done or shares in setting overall objectives. Seldom reports to superiors (e.g., psychologist, farm manager, geographer).
3	A more than average amount (Occasional supervision): Exercises independence within a framework established by top management. Generally not self-employed. Quality of work is evaluated at long intervals (e.g., secondary school teacher, social worker, production manager).
2	An average amount (Weekly or monthly supervision): Works closely with supervisor or under supervisor who assigns work regularly. Free to decide priorities and details of assigned work (e.g., physician's assistant, police officer, registered nurse).
1	A less than average amount (Daily supervision or unsupervised routine): Most activities are directly supervised or routinized, with little opportunity to act independently (e.g., nursing assistant, receptionist, bank teller).

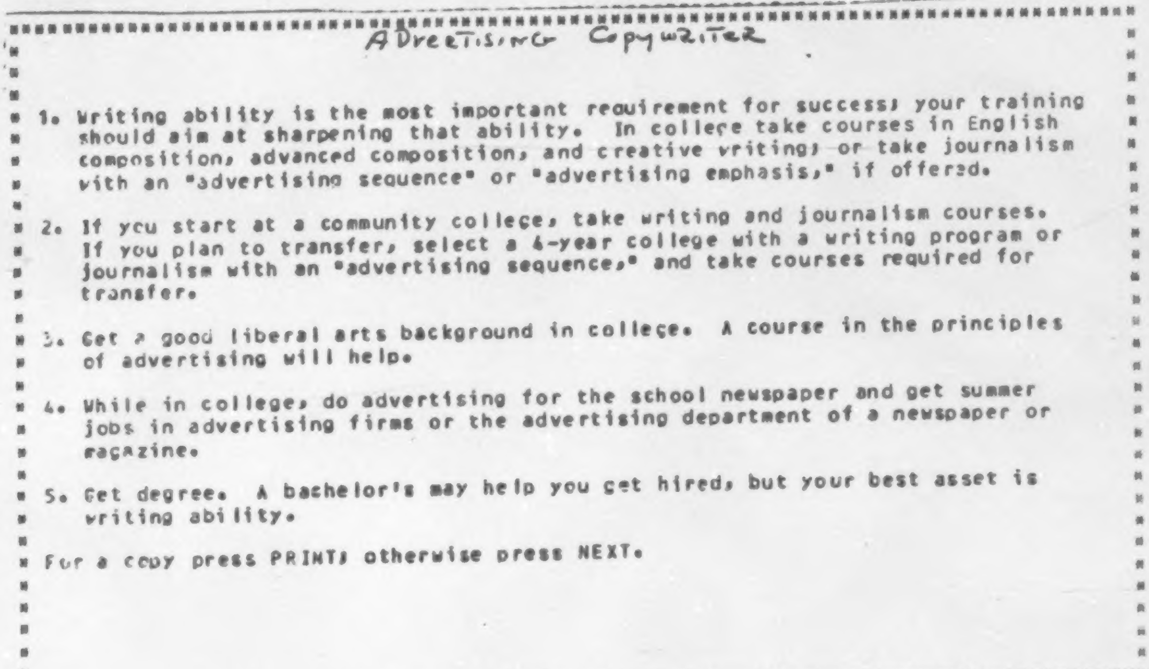
Figure 11. Illustration of how value ratings are determined. (From Occupational Information in SIGI.)

Revised 4/76

NAME AND NUMBER OF OCCUPATION: Advertising Copywriter 102

CLASSIFICATION: SHUD

OVERVIEW:



ADVERTISING COPYWRITER

```
********************************************************************************
*
*
*
* 1. Writing ability is the most important requirement for success; your training
*    should aim at sharpening that ability.  In college take courses in English
*    composition, advanced composition, and creative writing; or take journalism
*    with an "advertising sequence" or "advertising emphasis," if offered.
*
* 2. If you start at a community college, take writing and journalism courses.
*    If you plan to transfer, select a 4-year college with a writing program or
*    journalism with an "advertising sequence," and take courses required for
*    transfer.
*
* 3. Get a good liberal arts background in college.  A course in the principles
*    of advertising will help.
*
* 4. While in college, do advertising for the school newspaper and get summer
*    jobs in advertising firms or the advertising department of a newspaper or
*    magazine.
*
* 5. Get degree.  A bachelor's may help you get hired, but your best asset is
*    writing ability.
*
* For a copy press PRINT; otherwise press NEXT.
*
*
*
*
*
********************************************************************************
```

POSSIBLE CURRICULA: Journalism, English, Advertising, Marketing

SUGGESTED ELECTIVES: Introductory Psychology, Journalism, Social Psychology

SPECIAL NOTES: College courses in advertising that are one of the options for a Business major are not the best preparation for an advertising copywriter. They deal with the business side of advertising. On the other hand, courses that are one of the options for a Journalism major usually deal with the creative side of advertising and are appropriate for the would-be copywriter. The advertising option for Journalism is sometimes called the "advertising sequence" or "advertising emphasis."

Figure 12. Example of occupational information to help local college prepare its Planning system displays. (From Planning System Manual.)

REFERENCES IN THIS CHAPTER

Chapman, W., Norris, L., and Katz, M. SIGI: Report of a Pilot Study Under Field Conditions. Princeton, New Jersey: Educational Testing Service, 1973.

Kelly, G. The Psychology of Personal Constructs, New York: W. W. Norton, 1955.

Norris, L., and Katz, M. The Measurement of Academic Interests, Part II: Academic Interest Measures, College Board Research and Development Report 70-71, No. 5, and ETS Research Bulletin 70-67. Princeton, New Jersey: Educational Testing Service, 1970.

Siegel, Paul M. Prestige in the American Occupational Structure. Unpublished dissertation, Department of Sociology, University of Chicago, 1971. (Mimeographed.)

CHAPTER IV

EVALUATION DESIGN

Background

When funding by the National Science Foundation of the SIGI project began in June 1974, much development work on SIGI had already been done at Educational Testing Service under two grants from the Carnegie Corporation. The pilot study, funded in part by NSF, had examined its effects on a small sample of community college students and had validated its usefulness (Chapman, Norris and Katz, 1973). But at that time SIGI existed only as a single-user laboratory model. The present field test was designed to capitalize on previous accomplishments and bring SIGI from an experimental prototype to the threshold of delivery as an operating program.

To select representative sites for field-testing SIGI, ETS invited a group of delegates to attend a two-day conference at Princeton in the late spring of 1973. From this group, it was expected that a small number of institutions, geographically dispersed, would undertake to acquire the necessary hardware configuration, at their own cost, and to commit the time and effort that a full-scale field test would demand. In return, ETS offered to assist them in setting up and operating the system, to give them cost-free but nonexclusive use of all software and courseware for a period of about eight years, and to undertake the development of a multiple-terminal system within about three years.

These meetings bore fruit, despite the financial stringencies of the times and the lack of an iron-clad guarantee that the conversion to time-sharing (which allows several terminals to be used simultaneously) could be done successfully within three years. Among the institutions that agreed to participate were Eastfield College (Dallas, Texas), Santa Fe Community College (Gainesville, Florida), Pasadena City College (Pasadena, California), Delta College (University Center, Michigan), Mercer County Community College (Trenton, New Jersey), and Illinois State University (Normal, Illinois), which initiated negotiations independently.

At that time it looked as though SIGI would not have the time-sharing capability for about three years, with no guarantee that time-sharing would have been achieved even then. Consequently, four of the colleges ordered only one terminal when they purchased their hardware, expecting to add more when time-sharing became a reality. Santa Fe ordered four terminals from the start, and Delta ordered three. Soon after signing our agreement with the colleges, we entered into an arrangement with Digital Equipment Corporation (DEC) that gave SIGI an almost instantaneous time-sharing capability. DEC agreed to reprogram SIGI in its Basic Plus language so that SIGI could run under the RSTS (Resource-Sharing TimeSharing) system used by the PDP-11 series of computers. The result was that SIGI was a multiple-terminal system from the very beginning. Economic conditions and the constraints of budget planning, however, forced the four single-terminal colleges to operate in that mode during the field test. (Later, all four colleges bought additional terminals.)

Prior to the installation of SIGI at the colleges, the SIGI script was revised in light of findings from the pilot study, occupational information was updated, new occupations were added, a Prediction system was developed that was not dependent on test scores, manuals were prepared for SIGI users, and a counselors' handbook was written.

As soon as a contract was signed with a college, steps were taken to implement SIGI. Two or three key people from the college were invited to ETS for orientation to SIGI. They met the SIGI staff, interacted at the terminal, learned the requirements for hardware, and discussed the college's role in preparing their Prediction and Planning systems and in participating in the evaluation study. At first, we learned as much from these orientation meetings as the colleges did. Santa Fe and Pasadena, who were the first to come, taught us most and probably suffered most from our inexperience. By the time the remaining colleges came to ETS, we had a good idea of the amount of time and effort required to bring about a fully operating SIGI.

Each college was asked to designate a SIGI coordinator to handle liaison with ETS and to be responsible for data collection, scheduling of students, and so on. Usually, the coordinator was a dean or a director of counseling. In addition, the college named persons to be responsible for computer operation, the collection of data for the Prediction system, and preparation of displays for the Planning system.

The design of the SIGI software permitted its installation in two stages. The script was programmed so that the displays that are unique to each college (the Prediction system and a portion of the Planning system) are isolated from the rest of SIGI that is common to all users. This feature allows the college to use SIGI while the Prediction and Planning systems are being developed, or to forgo those systems entirely. The software for the common portion of SIGI was installed between February and April 1975 at five of the six colleges. (Installation at Delta was delayed until February 1976 because of an unavoidable delay in signing the contract.) The next six months were regarded as a "shake-down" period during which the colleges became familiar with SIGI, identified and remedied hardware and software problems, were exposed to a counselor workshop conducted by ETS staff, and continued development of their Prediction and Planning systems. As soon as work on these two systems was finished, the second stage of installation was performed. The evaluation of SIGI began after a college had reached a steady state operation.

Research Design

The foregoing narrative suggests a two-pronged evaluation, formative and summative. The purpose of the formative evaluation is to improve the operation of SIGI. We need to evaluate the adequacy of the SIGI courseware for use by unsophisticated students, as well as the procedures we have developed that enable a user college to install and operate SIGI and to implement its unique Prediction and Planning systems.

The purpose of the summative evaluation is to assess the impact of SIGI as a career guidance system.

Formative Evaluation

Adequacy of courseware. We wished to determine whether or not students could follow the SIGI displays without outside help. The SIGI script was completely revised as an outgrowth of the pilot study, but it had not been tested with students. Would some displays stand out as being hard to comprehend? Were there places in the program where students became confused over what to do next? Were there useful features in SIGI that students failed to take advantage of? Assessment of this dimension of the courseware is distinct from assessment of its effectiveness as a guidance instrument.

In order to make this assessment, we included some questions about the technical aspects of the system in the questionnaires we gave to the experimental students and the counselors (see below). These are questions 66-72, 82, 83, and 88 on the experimental questionnaire; and questions 15 and 30-35 on the counselor questionnaire. (The questionnaires are part of Appendix D.) The questions cover such topics as quality of the occupational information, suggestions for additions and improvements in the courseware, suitability of style and vocabulary, presence of bias, and so on. Also, we asked the SIGI monitors and coordinators to note problem areas in the program. Finally, we used our interviews with a sample of students (one part of the summative evaluation) as a means for uncovering problems and misconceptions.

Adequacy of operating procedures. The operation of SIGI requires the use of some utility programs for admitting new students to the system, handling student numbers, making the special demonstration numbers available to counselors and transitory users, and so on. Furthermore, SIGI was designed so that it could be operated by persons lacking special training in computers, and we hoped to make the procedures for starting up and shutting down, installing updates, transmitting data to ETS, and similar activities, as simple as possible. We therefore developed the SIGI Manager's Guide, which is reproduced in Appendix E.

The test colleges called us frequently when they had operating problems. From these calls and from questions directed to the person in charge of operating the SIGI computer at the colleges, we were able to judge the efficacy of the manual and to make improvements in it.

Implementation of the Prediction system. The version of the Prediction system that appeared in the pilot study was prepared by SIGI staff at ETS. At that time students' predictions were computed off line, transferred to magnetic tape, and inserted into the proper display when the student called for them. They were based on test scores, for the college had a mandatory testing program.

Obviously, such procedures would not be feasible for field installations. Furthermore, only one of the test colleges said that it had test scores available for computing predictions. We therefore had to develop and validate a test-free method of making predictions, as well as the manual, forms, and procedures that would enable the colleges to collect all the necessary data that underlie predictions.

In cooperation with Northern Virginia Community College, we did a crash study of the correlation between final grades and predictor variables consisting of previous performance and students' informed self-estimates of grades and grade factors. At the same time, the script for the Prediction system was rewritten and a prototype of the Prediction System Manual and forms was developed on the assumption that the study would be successful. The menu of grade factors was later synthesized from factors made up by Pasadena City College and Santa Fe Community College, which, as the first to develop Prediction systems, had the honor of devising the initial set of grade factors. Our experience with these colleges also helped us revise the Manual and forms.

Our evaluation of the Manual and attendant procedures comes from our experience with the colleges as they implemented the system. We were in constant touch by mail and telephone with the SIGI coordinators.

Implementation of the Planning system. The field-test colleges also had to prepare the displays required to implement the portion of the Planning system that is unique to each college. We developed the Planning System Manual to assist them in this activity, and we were also in frequent communication with the personnel at the colleges who were doing the actual work. As we gained experience with the first colleges, we were able to refine our procedures and smooth out the rough spots. Again, our evaluation of the implementation process was the activity of doing it.

Summative Evaluation

The summative evaluation efforts covered four major areas: (a) hardware reliability, (b) impact of SIGI on students, (c) the impact on counseling, and (d) summary data on student usage. Figure 13 is a schematic representation of the research design.

Hardware reliability. To determine the reliability of the SIGI hardware, we asked the field-test colleges to keep records of problems that affected the smooth operation of SIGI during the period from September 1 to December 1, 1976. (It was not until then that all six colleges had a complete system.) For one set of records, the computer operators kept a log of each hardware problem on a special form. The form was mailed to ETS every time a problem occurred. The SIGI monitors kept a separate record of all problems (including hardware malfunctions) that interfered with the normal operation of SIGI. This log was collected at the end of the test period. Appendix D contains examples of the letters and data collection instruments used by the computer operators and SIGI monitors for this aspect of the evaluation. In addition, the SIGI monitor and the person in charge of SIGI at each college were interviewed about the duties of the monitor and policies for scheduling students. Finally, the SIGI computer director at ETS, who was consulted frequently by the colleges when they had problems in the operation of SIGI, kept a record of such problems.

Impact on students. For purposes of summative evaluation, we wanted to know how SIGI affected the career decisions of students who used it and how the users differed from nonusers. To accomplish this, we interviewed a few students at each college who had gone through SIGI and we had questionnaires administered to a sample of SIGI users (experimentals) and a sample of students who had not used it (controls); we asked the colleges to select controls from students who were scheduled to use SIGI but had not yet started, but the colleges did not always adhere to that guideline.

Between 10 and 17 students who had used SIGI were interviewed at each college. These students were selected at random by the college's counseling staff. One or more members of the SIGI staff visited each college and tape recorded all interviews.

Three colleges were visited during the 1975-76 academic year in the late fall and early winter--ISU, Pasadena, and Santa Fe. A tentative part of the research design had been to test a newly developed measure of competence in career decision-making, called Simulated Occupational Choice (SOC), to see if it could serve as an objective measure of the effects of SIGI. Therefore at these three schools we not only interviewed students who had used SIGI, but we also interviewed students who were about to use it. SOC was administered to both groups. Unfortunately, the SOC measures were seen to be insufficiently sensitive to the kinds of behaviors we were trying to evaluate and the instrument was not used as part of the evaluation.

The three remaining colleges--Delta, Eastfield, and Mercer--were visited in the fall of the 1976-77 academic year. The site visits were done in two waves because these three colleges took longer to become fully operational owing to funding difficulties and delays in installing their Prediction and Planning systems. SOC was not used at these schools and only students who had used SIGI were interviewed.

As an aid to interviewing, individual student records kept by the computer were used when available to help students recall what their specific interactions with SIGI had been. Copies of key frames in the SIGI script also helped students to focus on specific questions. At two schools, Delta and Mercer, students were asked to bring their SIGI printouts to the interview.

During the interview, students were asked for their overall reactions to SIGI and each subsystem was discussed in detail. The purpose of the interviews was to assess changes experienced by students as a result of using SIGI and to get a personal, subjective view of what the process was like. At Mercer County Community College, we had the opportunity to interview students before, during, and after their use of SIGI. Time and distance prevented us from using this approach at the other schools.

In addition to the somewhat subjective data from the individual case studies, we got more objective data from the student questionnaires. Initial plans called for a random sample of 100 experimentals and 100 controls at each college. Owing to a tight time schedule, however, we were not always able to fill this quota, with the result that n's ranged from 50 to 130 students. Guidelines for administering questionnaires were sent to the colleges. (See Appendix D for copies of the questionnaires.)

Impact on counseling. At the time of the site visits by SIGI staff, questionnaires were distributed to counselors who worked with SIGI users and/or who worked in the area of career counseling. (See Appendix D for a copy of the questionnaire.) The number of counselors who responded at each college ranged from

6 to 14. The questionnaires were helpful in assessing the nature of the counselor interaction with SIGI users and their attitudes toward a computer-based guidance system. At Eastfield College, we had an opportunity to interview four counselors in addition to administering questionnaires.

Summary data on student usage. Descriptive data were collected by the computer on the behavior of students at each college by automatically recording responses to most displays. These data were extremely useful in showing the extent and patterns of use.

Analysis of Data

Data from logs, interviews, questionnaires, and computer records are reported and analyzed in the following six chapters, one chapter per college. Each chapter follows the same outline, and there is much repetition from one chapter to the next. We do not attempt in-depth analysis of the findings with respect to the individual colleges, since this report concerns SIGI, not the colleges. In-depth analysis has been reserved for a summary chapter that addresses the findings across all colleges.

The colleges will be treated in the order in which their SIGI was evaluated.

SIGI Field-Test Research at Each College

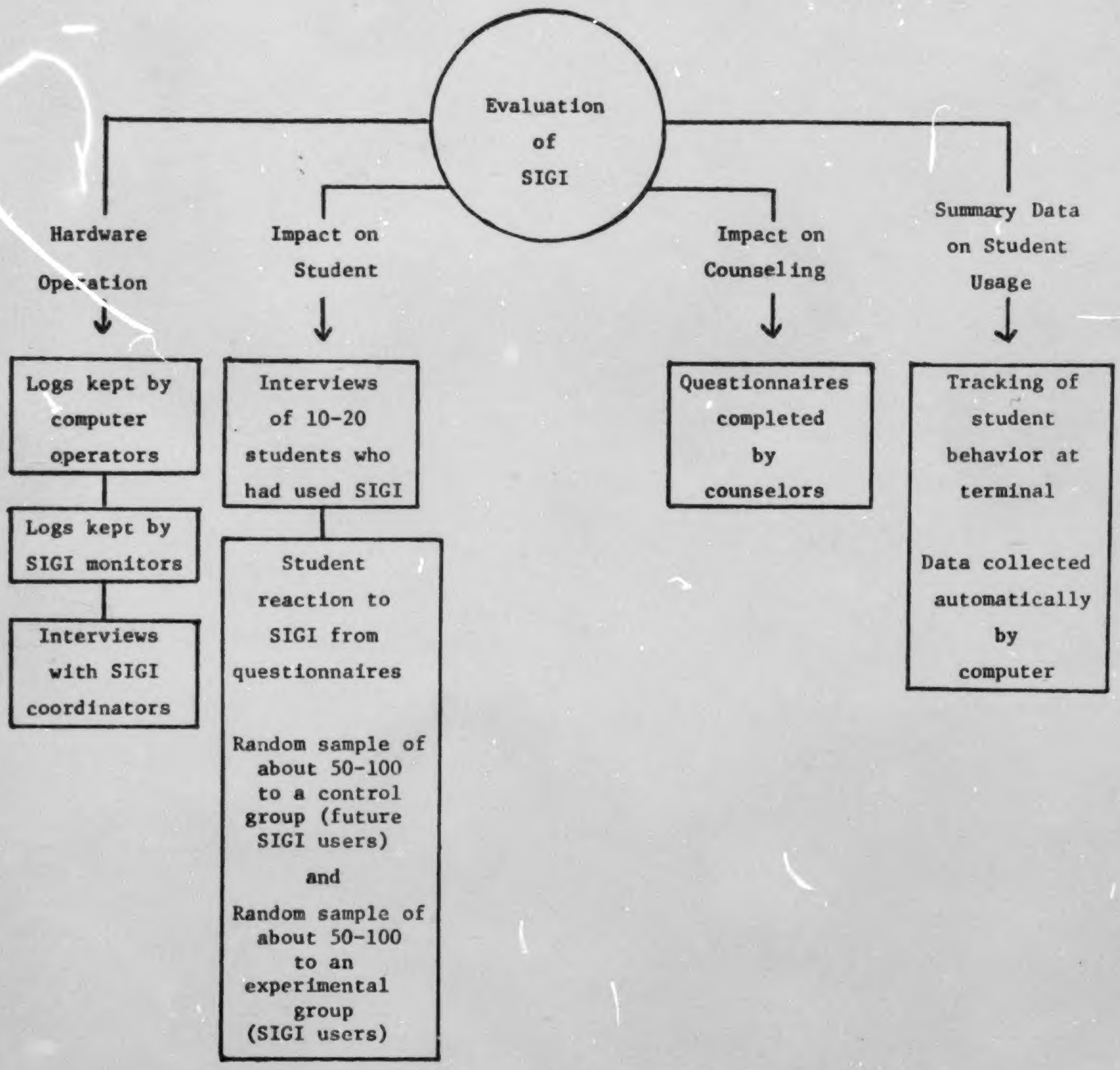

Evaluation of SIGI
Hardware Operation
Impact on Student
Impact on Counseling
Summary Data on Student Usage
Logs kept by computer operators
Logs kept by SIGI monitors
Interviews with SIGI coordinators
Interviews of 10-20 students who had used SIGI
Student reaction to SIGI from questionnaires
Random sample of about 50-100 to a control group (future SIGI users)
and
Random sample of about 50-100 to an experimental group (SIGI users)
Questionnaires completed by counselors
Tracking of student behavior at terminal
Data collected automatically by computer

Figure 13. Schematic representation of the summative evaluation design.

REFERENCE IN THIS CHAPTER

Chapman, W., Norris, L., and Katz, M. SIGI: Report of a Pilot Study Under Field Conditions. Princeton, New Jersey: Educational Testing Service, 1973.

CHAPTER V

FINDINGS AT ILLINOIS STATE UNIVERSITY

Description of College, Computer Configuration, and Career Counseling Services

Illinois State University (ISU) was the only field test site that was not a two-year college. Situated in Normal, Illinois, the university has an enrollment of approximately 20,000 students during the fall and spring terms and 8,000 during the summer.

Computer Configuration

When the evaluation team visited ISU in the fall of 1975, one SIGI terminal was in use. It was placed in the Career Center, a room that also houses the career reference library and that is adjacent to the Student Counseling Center.

SIGI was run on a PDP-11/40 based RSTS/E system. This system was dedicated to SIGI and did not support any other activities. Furthermore, the system was operated by the coordinator of career development, a counselor without prior computer experience, rather than by specialists in the university computing center, so that control over all aspects of SIGI would remain in the Career Center. The ISU system had 48K words of core memory and three RK05 1.2-million-byte cartridge disk drives. The computer was located in the same room as the SIGI terminal, which was wired in directly.

Some time after the evaluation visit, two new terminals were added, one for the Career Center and one for remote use. A third terminal for the Career Center was ordered for January 1977. All terminals at ISU are Delta Data 5000's, connected to the computer through DL11 and DC11 single line interfaces equipped with Texas Instrument 30-character-per-second printers. The remote terminal is connected to the computer via a leased line using a modem which is the Rixon equivalent of a 202 modem operating at 1200 baud. The original SIGI software was installed in February 1975.

How reliable is this hardware configuration? To find out, we asked the test sites to keep two logs from September 1 to December 1, 1976, one by the computer operators and the other by the SIGI monitors, describing each hardware problem and, if possible, identifying its source. The logs of the computer operators were sent to ETS every time there was a problem; the logs of the SIGI monitors were collected at the end of the test period.

During the time the logs were kept there were no problems beyond what might be expected in any computer system the size of SIGI. All the components are standard, off-the-sheif equipment requiring no modification for SIGI. Problems were taken care of by means of routine service procedures.

ISU had some problems with DEC service during the first few months of operation, but these were worked out. Also, when the additional interfaces and the remote terminal were installed in the fall of 1976, problems with parts and the modems delayed the operational availability of the terminal by several weeks.

Career Counseling Services

Description of counseling department. Counseling services are available to ISU students through the Student Counseling Center, which is staffed by 19 full-time and four part-time counselors. Counselors assist individuals and groups who wish to address academic, vocational, or personal problems.

By special agreement, no counselor workshop was conducted by ETS staff. Members of the evaluation team met with counselors during the site visit, however, and answered any questions they had.

Role of SIGI in counseling program. SIGI is part of a total career guidance program offered at ISU. Two of the SIGI terminals are situated in the same room as the career reference library and, as scheduling permits, are made available to students who seek appointments. The main use of SIGI, however, is as an integral part of the college's Career Choice course, a one-credit course open to all students. Students in the course are given priority in use of SIGI, a practice that severely limited access to SIGI for other students when only one terminal was in use. (Students not enrolled in the Career Choice course were referred to SIGI by counselors or student advisors. A small number gained access to SIGI by signing up without a referral.) The course is taught by senior members of the counseling staff. Its purpose is threefold: (a) to teach decision-making skills; (b) to relate decision-making skills to the students' educational and career choice; and (c) to integrate SIGI into the class format. A counseling group focused on career development is also available to students.

At ISU, the Coordinator of Career Development, who is also a staff counselor, oversees the SIGI project. With the assistance of other senior staff members and a graduate assistant, he prepared the prediction and planning systems.

Student advisers (paraprofessional counselors) and a secretary in the counseling center schedule student use of SIGI. At the time of the site visit, the SIGI terminal was available from 8:00 a.m. to 10:00 p.m., Monday through Thursday, and from 8:00 a.m. to 5:00 p.m. on Friday. Approximately 65 students used SIGI each week. Because the college had only one terminal, students often had to wait a month or more to use SIGI, and few of them were allowed full use of the system as initiates. The additional terminals reduced the waiting period.

Students were encouraged to speak to a counselor about their experience with SIGI at any point during their interaction with the system. They were required to schedule an "exit interview" with a member of the counseling staff following their last session with SIGI. However, according to one counselor, many students failed to show up for these follow-up discussions.

Impact on Students

To measure the impact of SIGI on its users, we interviewed a few students who had gone through SIGI at each college, and we had questionnaires administered to a sample of SIGI users (experimentals) and a sample of students who were interested in using SIGI but had not yet started (controls). The colleges themselves selected the students to be interviewed and administered the questionnaires in accordance with our guidelines. (See Appendix D, letter to the college.) This section of this chapter discusses our findings from the interviews and the questionnaires at ISU.

Interviews

Nineteen students volunteered to be interviewed, of whom seventeen were able to keep their appointments. These students had all been through SIGI or were almost through, and all were taking Career Choice, an elective course that used SIGI as a laboratory unit. Thirteen of the students were women and four were men, an imbalance that reflected the ratio of the sexes in the Career Choice class that made up the population of SIGI users at ISU. Only one student was over 30 years old, and only three were not freshmen (there were two sophomores and one senior). Interviews were scheduled for 1 1/2 hours.

It is not possible in this report to describe all 17 interviews in detail. Instead, we will describe the reactions of two of the students, Jason and Carla, whose experiences seemed to illustrate the ways SIGI may affect students with different needs and personalities. Then we will generalize from the other 15 interviews.

Jason. Jason was a freshman enrolled in a general studies program. He was a relaxed, articulate young man who seemed to feel confident about his career decision-making skills. At the beginning of the semester in which the interview took place, his first-choice occupation was mathematics teacher. His choice after going through SIGI was clinical psychologist, but he was quick to point out that this choice was tentative. He had several alternatives in mind and wanted to get more information before committing himself to any one of them.

Jason said that his new-found interest in clinical psychology was a direct outgrowth of his use of SIGI. SIGI helped him discover his values. He said, "One value was Helping Others. That's something that comes out in SIGI and that's something I do value highly. I would like to have that as part of my occupation." Besides making him aware of his values, SIGI introduced him to the concept of thinking about occupations in terms of values. He described his new insight this way:

> I could see that these were the values that were important as far as each occupation is concerned, that these are the things you should consider. I had never really thought about it that much and it made me think about it. In other words, it made me think is Prestige important to me over Independence or Helping Others over Security, or something like that. And once I started ranking them, it gave me a better idea of what I was looking for and what type of direction I was going in.

This experience led Jason to reconsider his plans to major in mathematics, a subject he had always done well in, and to choose instead to prepare for an occupation that would be most likely to satisfy his top-weighted values, Helping Others, the Personal Contact interest field, Prestige, and Independence. In responding to a questionnaire item about SIGI's influence on his choice of occupation, Jason wrote:

> SIGI didn't really find an occupation for me (I didn't expect it to), but rather it helped point me in the right direction, which is what I needed. Before coming [to ISU], I was considering majoring in math. After going through the Career Choice course and SIGI, I now see that what I'm really interested in leans more toward a social direction rather than a technical direction. Therapy, social work, psychology, and teaching (in math, possibly) are occupations that I now see interest me.

Jason impressed the interviewer as being a good career decision-maker. He demonstrated during the interview that he knew his values and understood their relationship to characteristics of an occupation. He knew what information he needed and how to go about getting it. He was aware of his special interests and abilities and recognized their importance in making predictions about success in various occupations. He had one occupation in mind but was keeping his options open. Finally, he felt he had control over his decision-making. He considered SIGI, as well as interest inventories, counselors, parents, and friends, to be valuable resources. But when it came to choosing his occupation, he would make the decision himself.

Jason's closing remarks about SIGI fairly well summed up his positive feelings about the system:

> It did make me more aware of what I was dealing with as far as deciding on a future occupation is concerned--different things to think about, different things to consider, different steps to decide what exactly I should do or where I could get information. I think the way I benefited most was from coming to the realization of my own values and how I ranked them. . . . It really made me think about it.

Carla. Carla was a sophomore. Although she was enrolled in an art program, her studies were not directed toward any occupational goal. In fact, she had no idea of what occupation she would eventually go into. She told us during her interview that she considered herself to be "one of the few students SIGI didn't help." She saw the potential value of SIGI, but attributed its ineffectiveness in her case to the fact that she had a hard time making decisions about anything. She said, "If I could make up my mind, then it would have helped me. . . . If I was the type of person that could decide what things would be right for me and stick them in the right order, it would be a good thing."

Carla's inability to commit herself, however tentatively, to expressing what she wanted from an occupation made the task of identifying and weighting her values virtually impossible. She felt frustrated going through SIGI's Values system because "the computer assumes you know your values and can easily rank them."

Being dissatisfied with the values and the way she had ranked them, Carla had little faith in SIGI's ability to suggest occupations appropriate for her. Furthermore, she rejected most of the occupations that Locate did retrieve because she believed they would not satisfy certain idiosyncratic values that lay outside the SIGI system and that she could not make explicit. For example, SIGI suggested some of the teaching occupations, but she thought she would not like them "because there may be kids in the class who don't really want to be there." Another occupation, for which ornamental horticulture provided preparation, was rejected because at ISU "there are so many prerequisites--two or three courses--for the ornamental horticulture program."

Carla's psychological problems were beyond the power of SIGI to resolve; she needed the help of a counselor and, in fact, began a series of weekly appointments soon after the interview. Nevertheless, her use of the system was by no means a waste of time.

She found SIGI to be a very good source of occupational information.

On her questionnaire she wrote:

> A lot of the information given [in SIGI] I know I could have gotten from the various books at the Career Center. But it is easier to see the information right in front of you and be quickly found instead of finding the books. In that respect SIGI is a timesaver. Another thing is that I feel confident that the information is current whereas with books it might be out of date.

Moreover, Carla accepted the method for decision-making that she found in SIGI. Before going on the system, she was totally bewildered about how to decide what field to enter. When she finished, she recognized that she had to explore her values and answer the central question, "What rewards and satisfactions do I want from an occupation?" Because of her experience with SIGI, she began to understand that she had an underlying emotional problem, and she was motivated to seek the help of a counselor. We hope that SIGI and the counselor, each supplementing the other, can together help this woman discover a satisfactory occupational goal.

Other interviews. Of the other 15 students we interviewed, six had begun their interaction with a fairly definite occupational goal in mind and nine had no such goal. What was the impact of SIGI on these students?

Two of the six who started with an occupational goal were confirmed in their choice: Jane wanted to become a Corrections Officer, explored the occupation, and found no grounds for changing her original opinion; Barbara expected to become a school administrator, examined the relevant teaching and administrative occupations in SIGI (School Administrator is not there as a separate occupation), and also found confirmation of her choice. Both thought that their decision was more solidly based than it had been before they started on SIGI. One woman was persuaded by SIGI to change her choice and another was on the verge of changing: Polly switched from Art Teacher to Occupational Therapist, an occupation retrieved in Locate, chiefly because she thought Occupational Therapist would provide greater satisfactions; Cathy, urged on by her voice teacher, hoped to become a professional singer, but became discouraged by information about income and outlook and was wary about continuing. And two students were leaning toward their original choices but were unwilling to commit themselves: Dan started with the idea of becoming a Rehabilitiation Counselor but opened his mind to School Counselor and Lawyer because of his interaction with SIGI; Diana, returning to the university after working nine years as a secretary, expected to become a Physical Education Teacher but lost some of her enthusiasm for that occupation and began exploring others because of the impact of SIGI.

The other nine students had no first-choice occupation in mind when they started SIGI or when they finished. SIGI did, however, have an impact on their thinking by proposing to them a new way to look at career decision-making in terms of their values and by providing a structure for the decision. One of these students spoke for the group when he said, "SIGI made me think in terms of different ways to look at occupations." To these students, the Values, Locate, and Compare systems were the most useful. Those who came to SIGI with more definite goals profited from Prediction, Planning, and Strategy as well.

In the judgment of the interviewers the university's Career Choice course and SIGI are an effective combination. The students we interviewed completed the course and SIGI knowing something about themselves and about occupations. They acquired a vocabulary that made them better able to express their values and ask relevant questions. Those who were thinking in terms of a definite goal when they emerged and those who were still unwilling to name a specific goal were similar in at least one respect: They seemed to have found an approach, however rudimentary, to rational decision-making.

Experimental and Control Group Questionnaires

About two-thirds of the SIGI terminal time was reserved for students enrolled in the Career Choice course and one-third was left open for other students and walk-ins. The questionnaires, unlike the interviews, reflect this ratio, and about one-third of the respondents had not taken or were not taking Career Choice.

Method of analysis. Separate questionnaires were given to students who had been through SIGI (experimentals) and to students who were scheduled to use SIGI but who had not actually used it (controls). This section of the report covers the responses of ISU students to the questionnaires. Since questions 1-41 are the same for experimentals and controls, we were able to run tests of significance comparing the responses of the two groups and to present the 41 questions, together with our findings, in a single table, I1. The portions of the questionnaires that are different are in separate tables: questions 42-45 for controls in Table I4 and questions 42-88 for experimentals in Table I5. (The intact questionnaires are in Appendix D.) In all cases the numbers in the tables are percentages unless otherwise indicated.

In the tests of significance, chi-squares were computed for most questions (1-24 and 37-41). In the computation, responses in logically related categories were grouped if the expected cell sizes fell below 5; this is a requirement for chi-square. For questions 25-29, in which students used scales to rate themselves on a variety of dimensions, t-tests were done on the computed group means. Questions 31-34 comprise an information test. Wrong answers for each question were scored 1 and correct answers 2. The four scores were then added and an information test score group mean was computed. It is shown opposite question 30 in Table I1. A t-test was then done on the two means. In reporting the results of all tests of significance, we follow the convention of using a single asterisk for significance at the .05 level and double asterisks for the .01 level.

Several of the questions are open-ended. Responses to these have been placed in separate tables. Tables I2 and I3 list the occupations named by experimental and control students in response to question 30 (What occupation would you like to prepare yourself for eventually?) The responses have been grouped according to whether or not the occupation named was among those already in SIGI. Other responses that could not be quantified appear in Tables I4A, I6, and I7.

Results. Questions 1-3 give a description of the sample in terms of age, sex, and college enrollment. The experimental and control groups do not differ significantly on these dimensions. In both groups, more than half of the students were women, over 98% were between 15 and 22 years old, and approximately two-thirds were freshmen.

Questions 4-10 concern students' assessment of their career decision-making skills. Significant differences were found in six of the seven questions: The experimental group (SIGI users) indicated greater knowledge of the rewards and satisfactions to be obtained from an occupation (question 4), had explored more occupations (question 5), had more definite and specific career plans (questions 7 and 9), and were more sure they could predict grades for one or two courses (question 8)--all $p < .01$. In addition, experimentals indicated more overall confidence ($p < .05$) in their career decision-making skills (question 10). The groups were not significantly different in the number of occupations that students thought would provide desired satisfactions (question 6).

Insert Table 11 about here

SIGI also seemed to stimulate activities related to career exploration (questions 11-18). Significant differences were found in responses to six of the questions: More experimentals had read about occupations (question 11), talked with people in the field (question 13), used the college career reference library (question 14), talked to a guidance counselor about careers (question 16), and, not unexpectedly, had used "a computer-based guidance system" (question 18)--all $p < .01$. Of the students who talked sometimes or often with friends about careers, a greater proportion of the experimentals (significant at the $p < .05$ level) talked "often" with friends (question 12). No significant differences were found in the level of activity in attending career planning workshops (question 15), or using career-related audiovisual materials (question 17).

Given the opportunity to agree or disagree with certain statements about choosing an occupation, students who had used SIGI were not significantly different from those who had not used SIGI. No significant differences were found in the attitudes of the two groups toward following the advice of others, toward the role of chance in career choice, in confusion brought on by conflicting advice from others, in attitudes about making their own decisions, toward the need to know marriage plans, or toward the need for making an immediate choice (questions 19-24).

Questions 25 through 29 explored the way students rated themselves as career decision-makers. For five of these questions a significant difference was found between the responses of the two groups. SIGI users distributed themselves closer to the "good" end of the career decision-making scale than did nonusers (question 25) and showed more confidence in their knowlege of occupations (question 26) and of goals and values (question 29)--all $p < .01$. For two of the questions, a significant difference was found at the $p < .05$ level. The experimentals planned ahead more often (question 27), and were more confident about their decisions, once made (question 28).

As a check on these self-ratings, four questions were included to test the students' actual knowledge of occupations (questions 30-34). Students were asked to name a first-choice occupation (question 30) and were questioned about the education required, average salary, amount of independence, and employment outlook for that occupation. Tables I2 and I3 list the occupations named by the two groups of ISU students. They show that most of the occupations of interest to both groups are already offered by SIGI. First-choice occupations named by 42 of the 53 students in the experimental group and by 28 of the 49 students in the control group were SIGI occupations. A few students in both groups named identifiable occupations not in SIGI. The rest--7 students in the experimental group and 14 in the control--were unable to name a specific occupation or were undecided.

Insert Tables I2 and I3 about here

The replies to question 30 were sometimes difficult to tabulate because students often were unable to identify a specific occupation or to express clearly what they had in mind. We sometimes had to make judgments about a student's meaning. When the staff could not reach agreement, they recorded the answer as Too Vague to Classify. When the occupation named in question 30 was a SIGI occupation, we were in a position to evaluate the accuracy of the students' responses to questions 31-34 for both groups. These four questions constitute an information test, which was scored in the manner described earlier. There were no significant differences between the experimentals and controls at ISU in the accuracy of their answers to these questions. The experimentals, however, got a higher proportion of correct answers on all questions except number 33, which concerned the amount of supervision found in the occupation.

Responses to questions 37-41 show that the two groups were similar in their career guidance experiences (excluding SIGI) at ISU. Approximately three-fourths of both groups had seen a counselor within the last two months (question 37) about a variety of problems (question 38), and over half had taken a career guidance course (question 39). Of those who had taken a career guidance course, the SIGI users were significantly ($p < .05$) less inclined to rate it as excellent (question 40). Generally, neither group had reservations about interacting with a computer for career guidance (question 41).

The remaining four questions in the questionnaire for the control group explored attitudes toward SIGI. They are listed in Table I4. Ninety-six percent of the group had heard of SIGI (question 42) and 100 percent wanted to use it (question 45). No one had formed an unfavorable impression of it (question 43). Members of the group had learned about it from a variety of sources (question 44).

Table I4A lists the responses of the control group to the open-ended questions.

Insert Tables I4 and I4A about here

The remaining 46 questions in the questionnaire for the experimental group sought to find out how these SIGI users rated their experience with SIGI (Table I5).

When asked to give SIGI a grade (questions 42-54), more than 75% of the students graded SIGI A or B for 8 of the 13 items (interest, clarity, overall usefulness, helping with values awareness, seeing relationships between values and career decisions, finding occupations to fit values, getting information, and learning to make career decisions). For four questions, which concern choice of an occupation, estimating probabilities of success, and helping to plan a program of study at ISU, the proportion of A's and B's was over 50%. For understanding predictions 49% of the grades SIGI received were A's or B's.

Insert Table I5 about here

As for their experience with SIGI (question 55), 21% said that SIGI helped confirm a choice they had already made, 17% said that SIGI helped them to choose an occupation, and 46% thought that SIGI had suggested other occupations worth considering. Only 15% failed to perceive SIGI as having been directly helpful.

Questions 56-63 asked the experimental students whether they would consult SIGI, a counselor, or a combination of the two for help with occupational and educational decisions. The students would tend to choose the combination for most guidance purposes. This preference held true for planning a program of study, getting information about an occupation, confirming an occupational choice, finding occupations that fit values, resolving conflicts about occupational choice, and estimating chances of success in a program. SIGI alone was preferred for making values more clear. A counselor alone was thought to be more help in finding out about financial aid.

A little over half (53%) of the students who had used SIGI planned to schedule a conference with a counselor for a variety of purposes (questions 64 and 65). Other purposes were mentioned by four students (see Table I6, question 65).

Most of the students (73%) said that the occupations in which they were interested were actually retrieved on the basis of their values in Locate (question 66). Although they named a few occupations as "missing" from SIGI (Table I6, question 67), the "occupations" they named were often not occupations at all, but general fields of interest; some were already in SIGI; some were specialties of occupations in SIGI; and some were occupations with only small numbers of workers. Two students mentioned occupations that are scheduled to be added to SIGI in the next round of additions (Display Worker, Agronomist). About three-quarters (74%) of the students regarded the information in SIGI as superior to other sources of occupational information (question 68).

Insert Table I6 about here

Of the ISU students who had used SIGI, 88% were satisfied with the 28 questions made available in Compare (question 69). Although a few made suggestions for additions, some of these were already in SIGI with different wording. The questions suggested for addition are recorded in Table I6.

About 94% of the students found SIGI's style and vocabulary to be "just right," and none said that it was too difficult (question 70). Since the reading level of the text was designed to be readily understandable, this finding is particularly encouraging.

Few students detected any sexual or racial bias in SIGI (question 71). The examples given by students who did feel there was bias appear in Table I6.

Ninety-one responses were made to question 72, asking about problems that might have occurred in using a computer-based system. Five percent reported that the computer had broken down; 12% reported that the writing on the screen caused eyestrain; 29% said they felt rushed while using SIGI. Some of the directions were unclear to 13%, and 5% thought that there was too much reading. A variety of other irritations were mentioned by the 13% of the students who checked "Other," such as inability to go back to correct mistakes or to control the number of printouts forced on them (Table I6, question 72).

Almost three-fourths of the SIGI users frequently took advantage of the opportunity to get printouts, and only 2% used the printer just once or twice (question 73). Over two-thirds (70%) tried to get more information on their own initiative after using SIGI (questions 74 and 75). Most (84%) of the students spent between two and four hours on SIGI, and 8% spent more (question 76). A large proportion of the sample (84%) went all the way through SIGI, including Strategy, at least once, usually in three or more sessions (questions 77 and 78). More than half (63%) expressed an interest in securing additional time on SIGI (questions 79 and 80).

The six subsystems of SIGI seemed to meet a variety of different needs; every section would be "used most" by at least some students, although Compare and Locate received the largest percentages of votes (27% and 21%, respectively). Strategy was the system named least often (question 81).

Students found SIGI to be comprehensive; 94% said that there was nothing more they would like it to cover (question 82). A few wrote in some general suggestions for improvement (Table I6, question 82). Nearly four-fifths (79%) said that there was no area that needed fuller coverage (question 83), but the others would have liked more material in one or another of the subsystems: more information on job opportunities and similar additions (Table I6, question 83). All areas were liked best by some students; Values was the most popular, designated best by 28% of the group (question 84). The privacy that SIGI makes possible was considered very important to 15% of the group, but it made no difference to another 20% (question 85). At least 72% of the group said that they had advised their college classmates to use SIGI; of these, more than half (55%) had recommended it to three or more friends (questions 86 and 87).

Question 88 asked the students for suggestions for improving SIGI. The answers are listed in Table I7. Most of the suggestions were for expansion of the information or services offered by SIGI or for minor changes to enable students to move more quickly to the sections in which they were most interested. There were a few suggestions that revealed insufficient information on the part of the student. The general tone, however, was one of approval, respect, and gratitude.

Insert Table I7 about here

Impact on Counseling

Responses of 13 Illinois State University counselors who filled out questionnaires are tabulated in Table I8. (The constructed responses to the open-ended questions on that instrument are in Table I9.) Six of the 13 had never attended a SIGI workshop, since, by special agreement, ETS did not conduct a workshop at ISU and the counselors had not received any formal instruction with regard to SIGI by the ISU counseling staff. It is possible that some of the responses would have been different if all the counselors had been exposed to a workshop.

With or without a workshop, however, the counselors were in general favorably disposed toward the idea of computer-based guidance (questions 4-8). Even the lone counselor who saw computer-based guidance as a potential threat (question 6) planned to use such a system in his or her counseling (question 7), and 11 counselors had actually referred students to SIGI (question 12). Counselors who had used SIGI and had observed SIGI students thought that those students reacted favorably to SIGI (question 13) and benefited in a number of ways (question 28). Most thought that the reading level of SIGI was appropriate for their students (question 32), that the occupational information was better than other sources available (question 33), and that SIGI was free from any kind of bias (question 34). Ten counselors said that students came to them with printouts (question 14), but only three commented on specific reactions to the printouts (see Table 19). Interpretation of the students' printouts was not a problem. Only three counselors said that students had encountered problems with the terminals (question 15): There were some hardware malfunctions, but most of the problems were routinely taken care of by student advisors and secretaries (Table I9).

Questions 16-23 were designed to explore the effect SIGI might have on problems that counselors face in career guidance. The chief problems were keeping up to date with occupational information, identifying sources of such information, getting students to read occupational information, and finding time for all the students; these were also frequently specified as minor problems, together with identifying students who need help and selecting appropriate programs for students' goals. Each problem was designated by at least two of the counselors as having felt the impact of SIGI. SIGI was seen to have had least effect on identifying students who need help and on selecting appropriate programs.

Insert Table I8 about here

Eleven counselors responded to questions 24-27, which explore the impact that SIGI may have exerted on counseling sessions. Of counselors who had had opportunity to observe, three thought that SIGI enabled them to see more students, whereas eight noticed no change; eight thought that SIGI had improved the quality of their discussions about values and career decisions, and none saw a decrease or no change in quality. Eight counselors saw no change in the amount of time they spent in career counseling, while one thought his time had increased and one thought it had decreased. No counselors thought their counseling sessions were longer because of SIGI, two thought they were shorter, and seven noticed no change.

Question 28 sought to discover how SIGI had affected students' career decision-making behaviors that might be observed in counseling sessions. Nine counselors indicated they were in a position to know. For all seven questions, the majority of counselors answered yes, that SIGI students clearly rated higher than non-SIGI students. The proportion of yes-to-no responses ranged from a high of 8 to 0 (questions 1 and 3) to a low of 5 to 2 (questions 2 and 7).

Question 29 explored the subject of how SIGI should be fitted into the structure of the counseling department. Only two counselors accepted the idea of making SIGI available to students on an entirely ad lib basis with no counselor intervention or mandatory follow-up. All the other responses favored a structure in which the counselor would play a direct role in the career guidance process. The two structures named most frequently were counselor referral to SIGI with mandatory follow-up and use of SIGI as part of some instructional apparatus; each was named 10 times. Two counselors suggested alternative configurations, and two other counselors made additional comments on the ideal configuration. (See Table I9).

Counselors named various occupations or occupational areas that they or their students would have liked to see in SIGI (questions 30 and 31). Five counselors made comments under "Suggestions for Improvement" (question 35), and five volunteered optional information. These comments and the suggested occupations are listed in Table I9.

Insert Table I9 about here

Usage of the System

The computer automatically records the responses that students make to most displays. Tables I10-I23 represent these summary data on students who used SIGI at Illinois State University. The n's vary from table to table, but frequencies in Strategy are approximately the same as frequencies in Values. Most SIGI users at ISU are enrolled in the college's Career course which uses SIGI as a lab. Students taking the course are given priority in gaining access to SIGI and are required to complete all of its subsystems. This pattern of use is different from patterns at most of the other field test sites. In any case, the reader should bear in mind that the summary data do not indicate the progress through SIGI of a particular group of students. They are merely a record of responses over a period of time. Some of the students were already in Planning or Strategy when the data collection began, and others were just beginning when the disk was swept clean of the accumulated data. Thus the tables are to some extent independent of one another. Nevertheless, the n's are sufficiently large to reflect the way SIGI was used.

Data from the SIGI Introductory Sequence

Breakdown of the sample. Table I10 shows the breakdown of this sample by age, sex, and enrollment status. Percentages are given rather than actual numbers because students are asked about their age and enrollment status every time they sign on, since these variables may have changed between sessions.

We see that half of "sign ons" were 18 or under--that is, they were students who had presumably gone directly to college from high school; consequently, there were proportionately fewer "older students." The sample contained more women than men, but the disproportion should not affect any

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Insert Table I10 about here

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of the data that follow, since SIGI is not programmed to differentiate between users by sex. Only about 5% of the sample had had no college experience.

Initial status with respect to career decisions. On their first pass through the introductory sequence, students respond to questions about their awareness of their occupational values, about their identification of occupations that fit their values, about their ability to predict their grades, and about their knowledge of appropriate programs to enroll in. Table I11 gives the distribution of their responses to these questions. The table reflects the state of mind of students as they begin their interaction with SIGI. We may make the following observations:

Insert Table I11 about here

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1. Almost one-fifth of the students in the sample said they knew their values, and over half of them had a general idea of what they want from an occupation but had not analyzed their values ("Value Status").

2. They tended to feel a need for much information about which occupations fit their values.

3. They believed that they could predict their grades successfully in at least some programs.

4. Most of them had little or no idea what program to enroll in and would like help in planning.

Data from the Values System

The Values system yields measures showing the importance that students attach to each of the ten occupational values used in SIGI and also indicates the field of interest they would like to work in.

Values weights. Table I12 shows the means and standard deviations of the weights that students assigned to the values on a scale where 0 designates no importance and 8 maximum importance. The figures in the "Unrestricted" column are the weights assigned by students before they played the Values Game--i.e., the numbers represent the students' initial reactions to the definitions of the values. The "Restricted" column reflects the effects of both the Values Game and the constraint that the sum of the weights equal 40. The latter condition, of course, largely accounts for the smaller means in the Restricted column. It is not possible to separate the effects of the Values Game and the restriction to 40 points on all changes from the Unrestricted to the Restricted columns. In general, however, it would not be unreasonable to attribute changes in rank order (Security, Independence, Income, Prestige, and Leadership) primarily to the Values Game.

Insert Table I12 about here

Table I12 shows (a) that each of the values was important to some students; (b) that there was no serious ceiling or floor effect, since even the highest and lowest weighted values exhibited sizable variation; (c) that, in general, Interest Field, Variety, and Helping Others were the three most important values for this group, whereas Early Entry was the least important; and (d) that in reaching the 40-point limit, students selectively reduced the weights originally assigned--that is, not all weights were decreased proportionately. Students were least willing to give up Interest Field, Income, Variety, and Helping Others and were most willing to reduce weights for Early Entry, Prestige, and Leadership.

The low weight given to Early Entry is not surprising, since all the students at ISU had already made a commitment to four years of education beyond high school.

It is also interesting to note that the standard deviations show very little reduction. Indeed, in one case (Helping Others), there is a slight increase. Thus, the restricted case does not appreciably reduce the variance of the weights.

Selection of interest field. Before weighting the value Interest Field, students indicate which one of the six fields interests them most. They are given the opportunity to change fields before they adjust their weights to sum to 40 and whenever they elect to return to the Values system to review the weights originally assigned.

Table I13 shows the number of times each field was selected. Note that "N = 856" in this table means that 856 interest field selections were made by the sample of students. Some may have chosen the same field more than once, and others may have changed fields.

Insert Table I13 about here

Table I13 shows that the Personal Contact interest field was clearly the most popular, with Verbal in second place. The Technological and Aesthetic fields were least popular.

Data from the Locate System

In Locate, students select a set of five values as a screen for retrieving potentially attractive occupations. The students specify a minimum return they would like on each value, and the computer then lists occupations that meet or exceed that minimum for each of the five values. Although students may choose any five of the ten SIGI values, the students are encouraged to choose their top-weighted ones.

Values selected for the screen. Table I14 shows the frequency with which each of the 10 values was selected as a member of the retrieval set.

It may be inferred that students tend to use their most cherished values

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Insert Table I14 about here

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in Locate, for there is close agreement between the rank order of the value weights (Table I12) and the rank order of the frequencies in Table I14.

Specification levels or categories. For each value except High Income and Interest Field the student may specify one of four possible levels; there are five levels for Income, and there are six categories (not levels) for Interest Field. Table I15 shows the frequency with which the various levels or categories were specified. Again, the n's and the numbers listed in the "FREQ" column indicate the number of times a value or specification was used, not the number of students making the specifications. Also, the numbers are associated only with values/specifications that actually retrieved acceptable lists of occupations. If a student's specifications are too strict or too loose, resulting in empty lists or ones of unwieldy size, he must alter the specifications, one at a time but in any order, until he finally arrives at a set that does retrieve.

Table I15 indicates that all the degrees of specification are used.

Insert Table I15 about here

The fact that the retrieval of an empty list forces the student to lower a specification (or change interest fields) may account for the frequency with which the lowest specification appears. (A value set at the lowest level does not screen, since all occupations meet or exceed that specification.) Table I15 also shows that students tend to specify mostly average and above average levels, and that when they use Interest Field as one of their search values, the most popular field (Personal Contact) was the one most frequently chosen in the Values system.

Occupations retrieved in Locate. What occupations do these values/specifications retrieve? Table I16 lists all the occupations in SIGI at the time of the data collection and the frequency with which each was retrieved. The frequencies include the interaction of initiates (students who have gone through the six subsystems in the prescribed order and who are consequently privileged to return to any subsystem) as well as novices.

In all, 137 occupations of the 155 in SIGI were retrieved for a total of 12,804 times. As would be expected from the relative popularity of various levels of specification, professional occupations were much more frequently retrieved than were nonprofessional occupations. The 18 occupations that were not retrieved are

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Insert Table I16 about here

Appliance Repair Technician
Automobile Mechanic
Automobile Salesworker
Bookkeeper
Correction Officer
Dancer and Dancing Teacher
EEG Technologist
Instrument Repair Technician
Keypunch Operator
Medical Lab Technician
Nursing Assistant
Operating Room Technician
Optician
Radio/TV Service Technician
Science Lab Technician
Stenographer
Telephone Craftsworker
Welder

No occupation appeared more frequently than about 4.5% of the total frequency for novices and initiates. If we pool the various teaching occupations, the most frequently retrieved occupations would be

Teacher
School Counselor
Speech Pathologist/Audiologist
Lawyer
Psychologist
Rehabilitation Counselor
Physician
Dentist
Occupational Therapist

Data from the Compare System

Occupations selected for examination. Table I17 shows the frequency with which students (initiates and novices) selected occupations for examination in the Compare system. Students may select any occupations they want, but they are particularly encouraged to investigate occupations retrieved in Locate because those occupations tend to satisfy their values.

Four occupations (Avionics Technician, Instrument Repair Technician, Optician, and Welder) were never selected. Students did not confine themselves only to occupations retrieved in Locate. For example, Medical Lab Technician, which was not retrieved at all in Locate, was selected 12 times in Compare; Correction Officer, which also failed to appear in Locate, was selected 40 times. On the other hand, the secondary school teaching occupations, which were among the most frequently retrieved in Locate, were asked about in Compare with relatively low frequency. It seems possible that many students tended to avoid the teaching occupations because they knew the job market has turned sour. In general, however, the two sets of frequencies appear to be quite consistent. The occupation most frequently asked about (over 5% of the total frequency) was Psychologist. In comparing absolute frequencies of occupations retrieved in Locate with those used in Compare, one must allow for the fact that a given occupation may be retrieved several times by one student through various lists of specifications in Locate, but will probably be selected only once by that student for examination in Compare.

Insert Table I17 about here

Questions for which answers were sought. Students may ask up to 28 questions about the occupations they have selected. (For a list of the questions, see Figure 2, Chapter II.) Table I18 shows the frequency with which each of the questions was asked. All the questions were asked

Insert Table I18 about here

with considerable frequency, the highest being 8.77% of the total. The least favored were "Opportunities for leadership?" and "Prestige level?" The five most often chosen were, in order,

Description of work activities?
Definition of occupation?
Employment outlook?
Education required--Early Entry?
Related college courses?

Data from the Prediction System

Reports of previous academic performance. Table I19 summarizes students' responses to questions about their previous academic performance. The responses are stored by the computer and may (or may not) be included among the predictor variables in any of the regression equations that compute the probability of a student's receiving various grades in a particular "key course." Table I19 shows that almost 70% of the Illinois State University students who used SIGI reported that they had ranked in the second or third fifth of their high school class and that their mathematics grades had been mostly B's and C's. They presented a somewhat rosier picture with respect to their English grades; two-fifths of the students reported that they had earned A's, and 85% of them said they had got B or better. On the other hand, while more than half of them were confident that they needed no help with English, about one-fifth of them believed positively that they did need help. Perhaps the students did not think that a grade of B or better in high school English guaranteed sufficient mastery for college work.

Insert Table I19 about here

Programs for which predictions were requested. The list of programs for which the student can obtain predictions is different at each college. At the time of the evaluation, predictions were available in 31 programs at

Illinois State University. Table I20 lists these programs and shows the frequency with which each was selected in the Prediction system. Students sought predictions in all the programs. The programs most frequently selected were

Insert Table I20 about here

Psychology, Business Administration, Biological Sciences, Special Education, and English.

Selection of questions about probability. Also available in the Prediction system are explanations of probability and prediction. The explanations are in the form of answers to five questions that the student (novice or initiate) may ask if he chooses. (See Figure 5, Chapter II for the wording of the questions.) The questions were included in SIGI because we knew from our past experience that the concept of probability is difficult for many students. The frequency with which each question was selected appears in Table I21. The questions were selected with about equal frequencies. One hundred seventy-five students (assuming that each student asked only one question) sought answers to one or another question. This is almost half (47%) of the students using the Prediction system, if we assume that the number of students is the same as or close to the number that reported their previous academic performance in Table I19--in the case of ISU, 372.

Insert Table I21 about here

Data from the Strategy System

(No summary data are collected from the Planning system. Indeed, the only information from that system that is worth recording as summary data would be the names and frequencies of the occupations selected for planning.)

In Strategy, the student selects a set of three occupations and indicates which one he favors most. Then he sees the Desirability Sums of the occupations. (See Chapter II, pages 32-34 for a description of Desirability Sums.) Next, he interacts with a discussion of a decision-making strategy based on assessment of rewards and risks, after which he estimates the probabilities of his successfully completing all the requirements for entry into each of the occupations. Finally, he once again indicates which of the occupations he favors most in light of the information he has accumulated about rewards (Desirability Sums) and risks (probability of entry).

Table I22 shows, in the first two columns, the frequency with which occupations were designated first choice when the set of three occupations was selected, and, in the third and fourth columns, the frequency with which they were designated first choice after assessment of rewards and risks.

Insert Table I22 about here

We must be cautious in interpreting Table I22, since it shows frequencies of choice, not changes. We cannot infer, for instance, that no students changed their minds about an occupation that has the same "post" frequency as "pre" frequency. We may note, however, that the most popular occupations, in terms of post frequency, were Psychologist, School Counselor, Lawyer, and Elementary School Teacher. Also, if we list occupations with a difference of 4 or more (in either direction) between the pre and post frequencies, we see that Rehabilitation Counselor, Urban Planner, Elementary School Teacher, and Optometrist made gains (10, 5, 4, and 4 respectively), whereas Flight Attendant (-8); Advertising Copywriter, Commercial Artist, Musician/Music Teacher, Social Worker (-6); Purchasing Agent (-5); and Public Relations Worker, Psychologist, Computer Programmer (-4) had losses.

Choice in relation to desirability outcomes. What influences students' choice of occupation in this context? Table I23 provides some insights. Under the heading "Desirability Outcome" are the frequencies with which students, in their pre choice, selected the occupation that later turned out to have the highest Desirability Sum, to come within 10 points of the highest sum[1], or to fall more than 10 points below the highest. Apparently, two-fifths of the students (43%) did not designate as their first choice the occupation that, as they soon learned, was the most likely to satisfy their values.

Insert Table I23 about here

The next set of figures, under the heading "Which Strategy," assesses the post choice of occupation with respect to the measures of reward and risk. The reader should understand that the options listed in the table do not all exist at the same time. For example, if the student had estimated that his chances were equal for successfully entering each of the three occupations, he would have only the last two options on the list: He could choose either the occupation with the greatest Desirability Sum or one with a smaller sum. If he had made differential estimates of success, some of the first four options would be present, but not the last two; moreover, it might be that none of the three occupations had the fortunate combination of greatest Desirability Sum and greatest chances, and therefore the student would not have the first option. The reader should also remember that Sum high means having the highest Desirability Sum or coming within 10 points of the highest.

---

[1] Students are told to ignore differences of 10 points or less between Desirability Sums. For a discussion of how the 10-point "error" term was estimated, see Counselor's Handbook for SIGI (which is Appendix G of this report), pp. IX-12--IX-14.

Nevertheless, we can make some inferences. The first four categories under "Which Strategy" represent instances of differences in both sums and chances. If we make the reasonable assumption that students would nearly always choose "Sum high, chances high" when that option was present, we have left 235 instances (116 + 97 + 22) where students had to choose on the basis of highest sum, best chances, or some combination in which neither factor was best. In 116 instances (49% of the time), they selected the occupation with the highest sum; in 97 instances (41% of the time), they selected the occupation with the best chances; and in 22 instances (9% of the time), they selected an occupation that had neither the highest sum nor greatest chances. (This last is not necessarily an illogical choice, since it may be the best combination of reward and risk. See Counselor's Handbook for SIGI, which is Appendix G of this report, pages IX-25--IX-26.) There were 36 occasions when students estimated their chances as equal for all three occupations. In this situation, they made the apparently logical choice (occupation with the highest sum) 26 times and the apparently illogical one 10 times. We must be careful, however, not to infer that those 10 choices came from students who did not know what they were doing. We have learned from our interviews that behavior which appears inexplicable in printouts often has some logical explanation--even if it is only that the student was late for class and pushed the last few buttons at random to reach "sign off" as quickly as possible.

Table I1: Responses by Experimentals and Controls to Questions 1-41 of SIGI Evaluation Questionnaires

(Unless otherwise noted, all figures except n's are percent.)

PERSONAL INFORMATION

C E

1. Age: $n_E = 53$
100 98 (1) 15-22 $n_C = 49$
0 0 (2) 23-30
0 2 (3) Over 30
0 0 (4) Rather not say

2. Sex: $n_E = 53$
37 21 (1) Male
63 79 (2) Female $n_C = 49$

3. Year in college: $n_E = 53$
69 66 (1) 1st
21 24 (2) 2nd $n_C = 49$
8 8 (3) 3rd
2 2 (4) 4th
0 0 (5) Graduate student

CAREER DECISION-MAKING

** 4. How well do you know what rewards and satisfactions you want from an occupation? $n_E = 54$
0 28 (1) I know exactly what I want from an occupation.
90 65 (2) I have a general idea of what I want from an occupation. $n_C = 49$
8 7 (3) I'm not sure what I want from an occupation.
2 0 (4) I have no idea what I want from an occupation.

** 5. How many occupations have you explored as possibilities for yourself? $n_E = 53$
8 0 (1) None
32 13 (2) 1-2 $n_C = 48$
52 49 (3) 3-4
8 38 (4) More than four

6. How many of the occupations that you know about are likely to give you the satisfactions you want? $n_E = 53$ $n_C = 49$
10 4 (1) None
64 57 (2) 1-2
20 34 (3) 3-4
6 6 (4) More than 4

** 7. Which of the statements below best describes how definite your career plans are? $n_E = 53$
8 19 (1) I know exactly the occupation I want to enter.
27 30 (2) I am trying to decide between two different occupations. $n_C = 48$
27 43 (3) I am considering three or more different occupations.
38 8 (4) I do not have any specific occupation in mind at this time.

** 8. How well do you think you can predict your grades in various programs at your college? $n_E = 53$
20 19 (1) I think I could predict my grades accurately in any program of study I might take. $n_C = 49$
37 68 (2) I think I could predict my grades accurately in one or two programs, but not in all
37 11 (3) I have only a general idea of my grades in one or two programs.
6 2 (4) I can't predict my grades well in any program.

** 9. Which of the following best describes the present state of your plans? $n_E = 53$
10 26 (1) I know which program to enroll in, which courses to take, and most of the other steps necessary to reach my occupational goal. $n_C = 49$
47 58 (2) I have a general idea of which program would be best, but I am not sure what other steps are necessary to reach my occupational goal.
43 15 (3) I don't know which program to take. I need help in planning my education.

Table I1 (continued)

C		E	
	*10.		Overall, how confident do you feel about your career decision-making skills? $n_E = 48$ $n_C = 49$
8		25	(1) Very confident
69		69	(2) Somewhat confident
23		6	(3) Not confident

Items 11-18 are activities related to thinking about occupations. Put a check under the heading which shows how much time you have spent on ***each*** of the activities.

		Never	Rarely	Sometimes	Often
**11.	Reading about occupations. $n_E = 52$ ($n_C = 49$)	0 (6)	15 (4)	71 (49)	13 (4)
*12.	Talking with friends about the kinds of occupations they are considering. $n_E = 58$ ($n_C = 49$)	0 (2)	9 (4)	25 (49)	66 (45)
**13.	Talking with people in the field about their occupations. $n_E = 52$ ($n_C = 49$)	0 (14)	38 (39)	42 (37)	19 (10)
**14.	Using the college's career reference library. $n_E = 51$ ($n_C = 49$)	20 (63)	47 (27)	27 (10)	6 (0)
15.	Attending career planning workshops. $n_E = 51$ ($n_C = 48$)	57 (69)	35 (21)	6 (10)	2 (0)
**16.	Talking to a guidance counselor about careers. $n_E = 51$ ($n_C = 49$)	4 (22)	33 (51)	53 (25)	10 (2)
17.	Using career-related audiovisual materials. $n_E = 51$ ($n_C = 49$)	55 (63)	24 (29)	18 (6)	4 (2)
**18.	Using a computer-based guidance system. $n_E = 51$ ($n_C = 49$)	4 (92)	20 (4)	51 (4)	25 (0)

For statements 19-24, put a check under the heading that best describes how you feel.

		Strongly Disagree	Disagree	Agree	Strongly Agree
19.	I would follow the advice of a teacher, counselor, parent, or friend in planning my career. $n_E = 52$ ($n_C = 49$)	8 (4)	37 (23)	50 (71)	6 (2)
20.	Which occupation I enter will be mostly a matter of chance. $n_E = 52$ ($n_C = 50$)	56 (44)	42 (52)	2 (4)	0 (0)
21.	Everyone seems to tell me something different, so I don't know which career to choose. $n_E = 51$ ($n_C = 49$)	18 (12)	63 (55)	18 (31)	2 (2)
22.	I will decide for myself which occupation to choose. $n_E = 51$ ($n_C = 49$)	0 (0)	4 (6)	51 (51)	45 (43)
23.	In order to plan for a career, I would need to know how soon I would be getting married. $n_E = 53$ ($n_C = 48$)	40 (33)	36 (57)	17 (6)	7 (4)
24.	There is plenty of time before I have to start thinking about choosing an occupation. $n_E = 52$ ($n_C = 50$)	31 (26)	58 (70)	11 (2)	0 (2)

Table I1 (continued)

	$\overline{X}$	S.D.
**25. $n_E = 49$	6.43	1.63
$n_C = 49$	5.45	1.90

**25. Rate yourself on how good a career decision-maker you think you are. $n_E = 49$ $n_C = 49$

Look at the scale below. Think of a friend your age who, in your opinion, makes good career decisions. Consider that person at the top of the scale (10).

Think of a friend your age who is not a good career decision-maker. Consider that person at the bottom of the scale (0).

Now think about yourself as a career decision-maker. Where do you fit on this scale? Circle the appropriate number on the scale from 0 to 10.

	0	1	2	3	4	5	6	7	8	9	10
E	0	0	0	8	8	8	16	31	24	4	0
C	0	0	4	13	13	12	21	31	2	4	0

0 = A poor career decision-maker; 10 = A good career decision-maker

For items 26- 29 mark an X on the part of the scale which best shows what is true of you.

**26. How much do you know about occupations? $n_E = 53$ $n_C = 48$ — $\overline{X}$: 2.49, 1.72; S.D.: .67, .70

	0		1		2		3		4
E	0	0	2	4	40	6	47	2	0
C	0	0	27	10	38	18	4	2	0

very little — a great deal

*27. How often do you plan ahead? $n_E = 52$ $n_C = 49$ — $\overline{X}$: 3.11, 2.73; S.D.: .78, .89

	0		1		2		3		4
E	0	0	0	2	19	6	37	2	35
C	0	6	2	0	23	4	43	10	12

rarely — often

*28. How do you feel after making an important decision? $n_E = 51$ $n_C = 48$ — $\overline{X}$: 2.94, 2.70; S.D.: .54, .82

	0		1		2		3		4
E	0	0	0	0	16	10	53	14	8
C	2	0	4	4	19	6	46	13	6

I usually don't think I've done the right thing. — I am sure I did the right thing.

**29. How clear is your knowledge of goals and values? $n_E = 51$ $n_C = 46$ — $\overline{X}$: 3.36, 2.57; S.D.: .60, .98

	0		1		2		3		4
E	0	0	2	0	0	6	41	16	35
C	4	0	7	4	21	9	35	9	11

not clear — very clear

OCCUPATIONAL INFORMATION

30. What occupation would you most like to prepare yourself for eventually? Even if you are undecided, pick an occupation that appeals to you. $n_E = 42$ $n_C = 28$ — $\overline{X}$: 6.26, 5.79; S.D.: 1.15, 1.07

Name of occupation: Items 31+32+33+34, Information Test

Table I1 (continued)

Answer questions 31-34 in relation to the occupation named in Item 30.

% Right	% Wrong
E 79	21
C 64	36

31. To enter this occupation, how much education beyond high school would you need?

___ (1) None.
___ (2) 2 years.
___ (3) 4 years (bachelor's degree).
___ (4) 5-6 years (master's degree).
___ (5) 7 or more (doctorate or law degree).
___ (6) Other (please explain: ______________________________)
___ (7) I don't know.

% Right	% Wrong
E 52	48
C 25	75

32. Check the salary range that indicates the average amount of money per year earned by people in this occupation.

___ (1) $20,000 or more
___ (2) $15,000-$19,999
___ (3) $11,000-$14,999
___ (4) $8,000-$10,999
___ (5) $7,999 or less
___ (6) I don't know.

% Right	% Wrong
E 38	62
C 54	46

33. Check the one statement which best describes the amount of supervision usually received by workers in this occupation.

___ (1) Work without supervision; plan own work; seldom evaluated by others.
___ (2) Supervised weekly; follow overall assignments.
___ (3) Supervised daily; work under supervisor who assigns and schedules work; free to decide details of work.
___ (4) Supervised hourly; activities are directly supervised with little opportunity to act on your own.
___ (5) I don't know.

% Right	% Wrong
E 64	36
C 39	61

34. Check the one statement which best describes the future employment prospects for workers in this occupation.

___ (1) Excellent: Strong demand for workers; shortage of qualified people.
___ (2) Good: Steady demand for workers.
___ (3) Fair: Demand limited except in certain geographic areas OR demand is decreasing due to automation or economic conditions.
___ (4) Poor: Little demand, if any; the occupation is very overcrowded, and few jobs are available.
___ (5) I don't know.

35. What college program (major) are you presently enrolled in? ______________

36. What occupation are you preparing for in this program or major? ______________

CAREER GUIDANCE

37. Have you seen a counselor during the last two months? $n_E=53$ $n_C=49$ 75/76 (1) Yes 25/24 (2) No

38. If yes, what thing(s) did you discuss? $n_E=144$ $n_C=98$

C	E	
8	8	(1) Your values
12	17	(2) Occupational choice
11	14	(3) Occupational information
20	23	(4) Curriculum choice
29	19	(5) Course selection
3	7	(6) Chances for success
9	7	(7) Program approval
3	5	(8) Family pressures
4	8	(9) Financial aid
1	1	(10) Other (please explain: ______________________________)

Table I1 (continued)

39. Have you taken or are you presently enrolled in a career guidance course at your college? $n_E = 53$ 68 (1) Yes 32 (2) No

$n_c = 49$ 57 43

C		E	
	*40. If yes, how would you rate it? $n_E = 37$ $n_c = 23$		
61		27	(1) Excellent
39		68	(2) Adequate
0		5	(3) Poor

	41. How do you feel about interacting with a computer for career guidance? $n_E = 53$ $n_c = 48$		
67		77	(1) Favorable
33		19	(2) Neutral
0		4	(3) Unfavorable

$^{*}p < .05$

$^{**}p < .01$

Table I2

Occupations Named by Experimentals in Response to Question #30

In SIGI[a]	Not in SIGI	Too Vague to Classify
(42 occupations)	(4 occupations)	(7 responses)
Accountant (2)[b]	Business Administrator	Clinical therapist
Correction Officer (2)	Business Manager	Journalist
Dietitian	Buyer, Merchandising	Parks & recreation (2)
Fine Artist	School Administrator	Patient education
Flight Attendant		Radio & T.V.
Floral Designer		(Blank)
Interior Designer		
Interpreter		
Lawyer (3)		
Medical Record Administrator		
Medical Technologist		
Occupational Therapist (2)		
Oceanographer		
Physical Therapist (2)		
Physician		
Public Relations Worker		
Recreation Worker		
Rehabilitation Counselor (2)		
School Counselor (2)		
Secretary		
Singer		
Social Service Aide		
Social Worker		
Speech Pathologist		
Teacher, English		
Teacher, Industrial Arts		
Teacher, Physical Education (4)		
Teacher, Special Education (4)		

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[a] If the occupational title used by the student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Social Worker Aide" is listed as "Social Service Aide," "Stewardess" as "Flight Attendant," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table 13

Occupations Named by Controls in Response to Question #30

In SIGI[a]

(28 occupations)

- Accountant
- Actor/Actress
- Civil Engineer
- Commercial Artist
- Flight Attendant (2)[b]
- Insurance Agent
- Lawyer (2)
- Medical Technologist
- Photographer
- Physician's Assistant
- Psychologist (3)
- Public Relations Worker
- Singer/Singing Teacher
- Social Worker (4)
- Teacher, Business
- Teacher, Early Childhood
- Teacher, Elementary (5)

Not in SIGI

(7 occupations)

- Administration of a recreation center or park district
- Business Manager
- Cartoonist-illustrator
- Golf Pro
- Literary Critic
- Manager of a small or medium-sized business
- Politician

Too Vague to Classify

(14 responses)

- Advertising or marketing
- Airline work
- Airlines, travel agency
- Business
- Communications
- Correction or law
- Counseling with a family--oriented organization, family planning agency
- Law enforcement, history
- Medical field
- Natural resources management
- Plant & soil science
- Public relations or math
- Radio broadcasting
- Science or math-related

---

[a] If the occupational title used by student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Nursery School Teacher" is listed as "Teacher, Early Childhood," "Stewardess" as "Flight Attendant," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table I4

Responses to Questions 42-45 of SIGI Evaluation Questionnaire for Controls

(Unless otherwise noted, all figures except n's are percent.)

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42. Are you aware that there is a computerized guidance system (SIGI) on campus? n = 47
96 (1) Yes 4 (2) No

43. If yes, what is your impression of SIGI? n = 45
58 (1) Favorable
20 (2) Neither favorable nor unfavorable
0 (3) Unfavorable
22 (4) No impression

44. How did you learn about SIGI? n = 54
22 (1) Friends
33 (2) Counselor
4 (3) Posters, Brochures
9 (4) Newspaper
32 (5) Other (please explain: ______________________________)

45. Do you want to use SIGI? n = 49
100 (1) Yes 0 (2) No

If yes, when? ______________________________

If no, why not? ______________________________

PLEASE RETURN THIS QUESTIONNAIRE TO ETS IN THE ENVELOPE PROVIDED.

THANK YOU FOR YOUR COOPERATION.

Table I4A

Control Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #38 (Other Reasons for Seeing a Counselor)

Exploring how to register for second term.
My life, my future, my feelings.

Question #44 (Other Ways of Learning About SIGI)

Career choice class. (Mentioned by 11 students.)
Class enrolled in.
Preview.
A counselor speaking to a group.
Choosing a major.
Student Association on floor.
Told of it by counseling center at freshmen orientation.
All of the (ways suggested).
Teacher.

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[a] Some of the responses have been slightly edited.

Table I5

Responses to Questions 42-88 of SIGI Evaluation Questionnaire for Experimentals

(Unless otherwise noted, all numbers except n's are percent.)

EVALUATION OF SIGI

Circle the grade that you would give SIGI on each of the following:

42. How interesting was SIGI to you? n = 52	50 A,	35 B,	15 C,	0 D,	0 or F
43. How clear was SIGI in giving information? n = 53	A, 58	B, 30	C, 11	D, 0	or F 0
44. Overall, how good is SIGI? n = 53	A, 40	B, 42	C, 17	D, 0	or F 2

Circle the grade that shows how useful SIGI was in each of the following:

45. Helping you decide which occupation to prepare for. n = 53	23 A,	30 B,	30 C,	9 D,	8 or F
46. Helping you become more aware of your values. n = 53	A, 68	B, 19	C, 9	D, 4	or F 0
47. Showing you the relationship between values and career decisions. n = 53	60 A,	28 B,	11 C,	0 D,	0 or F
48. Helping you find out which occupations might fit your values. n = 51	A, 41	B, 35	C, 16	D, 4	or F 4
49. Helping you get information about occupations. n = 53	A, 53	B, 36	C, 6	D, 6	or F 0
50. Helping you understand grade predictions expressed in probabilities. n = 51	A, 25	B, 24	C, 41	D, 6	or F 4
51. Helping you estimate probabilities of success in one or more programs. n = 52	21 A,	37 B,	35 C,	6 D,	2 or F
52. Giving information about programs of study at your school. n = 49	A, 27	B, 29	C, 35	D, 10	or F 0
53. Helping you plan a program appropriate for an occupation you are considering. n = 51	16 A,	41 B,	31 C,	12 D,	0 or F
54. Helping you learn how to make career decisions. n = 52	A, 29	B, 46	C, 17	D, 6	or F 2

55. What role has SIGI played in your occupational choice? n = 52
17 (1) SIGI helped me to choose an occupation.
21 (2) SIGI helped confirm the choice I had already made.
46 (3) SIGI suggested other things which I am considering.
15 (4) SIGI provided little or no help.

Table I5 (continued)

To get help with occupational and educational decisions, you can go to SIGI and to a counselor. For each of the following, (56-63), put a check under the heading which, in your opinion, represents the best source of help.

	SIGI Alone	Counselor Alone	SIGI & Counselor
56. Plan program of study n = 52	6	33	62
57. Get information about occupations n = 52	29	2	69
58. Confirm an occupational choice n = 51	20	31	49
59. Find occupations that fit values n = 52	46	2	52
60. Find out about financial aid n = 51	4	71	25
61. Make values more clear n = 52	60	4	37
62. Resolve conflicts about occupational choice n = 50	12	18	70
63. Estimate chances of success in a program n = 52	33	12	56

64. Have you scheduled or do you plan to schedule an appointment with a counselor as a result of using SIGI? n = 51
53 (1) Yes 47 (2) No

65. If yes, what was or will be the purpose of this visit? Check all the topics you discussed or plan to discuss. n = 126
5 (1) Your values
17 (2) Occupational choice
17 (3) Occupational information
15 (4) Curriculum choice
18 (5) Course selection
7 (6) Chances for success
7 (7) Program approval
2 (8) Family pressures
4 (9) Financial aid
6 (10) SIGI print-outs
2 (11) Other (please explain: ______________________________)

66. In using SIGI, did the occupations of interest to you show up on the list determined by your values? n = 49
73 (1) Yes 27 (2) No

67. Were there any occupations missing from SIGI that you were interested in?
___ (1) Yes ___ (2) No

If yes, name them: ______________________________

____

68. Compared to other kinds of occupational information, how would you rate the occupational information presented in SIGI? n = 47
74 (1) Better
26 (2) About the same
0 (3) Worse

69. SIGI has 28 questions you can ask about occupations. Are there other questions about occupations that you wish had been in SIGI? n = 50
12 (1) Yes 88 (2) No

If yes, what question(s) would you add to the SIGI list?

____

____

Table I5 (continued)

70. How would you rate SIGI's writing style and vocabulary? n = 47
0 (1) Too difficult
94 (2) Just right
6 (3) Too simple

71. Did you find sexual, racial, or other bias in SIGI? n = 44 5 (1) Yes 95 (2) No

If yes, give examples:

72. Below is a list of problems that may have occurred in using SIGI. Check any that you experienced: n = 91
13 (1) I did not understand some of the directions.
12 (2) The writing on the screen strained my eyes.
7 (3) I had to wait too long for an appointment to use SIGI.
5 (4) There was too much reading.
29 (5) I felt rushed while using SIGI.
5 (6) The computer broke down while I was using SIGI.
2 (7) The writing on the screen was jumbled.
13 (8) I wanted to sign off SIGI, but couldn't.
13 (9) Other (please explain: ______)

73. How often did you request a print-out on SIGI? n = 49
71 (1) Frequently
27 (2) Sometimes
2 (3) Once or twice
0 (4) Never

74. After using the computer, did you do anything to get more information on your own? n = 50
70 (1) Yes 30 (2) No

75. If yes, what did you do? n = 35
40 (1) Read
46 (2) Spoke to people in tha occupation
6 (3) Used audiovisual material
9 (4) Other (please explain: ______)

76. How much time did you spend on SIGI? n = 50
8 (1) 1-2 hours
84 (2) 2-4 hours
8 (3) 4-6 hours or more

77. Did you go all the way through SIGI (including the Strategy section)? n = 51
84 (1) Yes 16 (2) No

78. Over how many sessions did you use SIGI? n = 51
2 (1) One
14 (2) Two
84 (3) Three or more

79. Do you think you would profit from further use of SIGI? n = 49 63 (1) Yes 37 (2) No

80. If yes, how many additional sessions would you like? n = 32
38 (1) One
53 (2) Two
9 (3) Three or more

Table I5 (continued)

81. Which sections would you use most? n = 102
12 (1) Values
21 (2) Locate
27 (3) Compare
17 (4) Prediction
13 (5) Planning
11 (6) Strategy

82. Is there anything SIGI didn't cover that you would like it to cover? n = 47
6 (1) Yes 94 (2) No

If yes, please explain:

83. Is there any area you wish SIGI had covered more fully? n = 48 21 (1) Yes 79 (2) No

If yes, please explain:

84. What did you like best about SIGI? (check one only) n = 74
28 (1) Learning about my values
23 (2) Finding occupations that fit my values
19 (3) Getting occupational information
3 (4) Getting grade predictions
9 (5) Learning what courses to take to prepare for an occupation
4 (6) Learning a strategy for making decisions
9 (7) Learning how values affect decisions
4 (8) Other (please explain:)

85. What you did on SIGI was completely private. How important is this fact to you? n=54

0		1		2		3		4
20	4	20	2	17	6	11	6	15
privacy made no difference								very important

86. Have you advised friends at your college to use SIGI? 72 (1) Yes 28 (2) No
n = 53

87. If yes, how many? n = 38
45 (1) 1-2
45 (2) 3-5
10 (3) 6 or more

88. Is there anything else you would like to tell us that would help us improve SIGI?

Table I6

Experimental Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #65 (Purpose of Appointment with Counselor)

How many years of education for certain occupations?
Possible summer job for experience.
Picking a major.
Changing a major.

Question #67 (Occupations of Interest Missing From SIGI)[b]

School administration.
Personnel interviewing.
Display man.
Farming.
Teaching speech or theater.
Range manager.
Agronomist.
Director--theater and film.
Internist.
Podiatrist.
Botanist.
Occupations in history.
Certified occupational therapist assistant (COTA).
Crafts designer.

Question #69 (Additional Questions Students Would Like to Ask)[b]

How can occupations combine different interests? [i.e., math, writing, teaching].
Course curriculum.
More specific information on courses.
Regional information.
How long before you are able to be in the job--some jobs have internships which SIGI didn't mention.
Would like more questions, and have them asked more quickly.
Do you have a lot of travel on the job?
What are the ways to better one's education to fit the occupation?

Question #71 (Examples of Bias in SIGI)

When examples of make-believe jobs were given, they usually applied to males.
The fact that the computer assumes you know your values and can easily rank them for determining a career. I can't yet do this and I'm sure others can't either.

Table I6 (continued)

Question #72 (Other Problems in Using SIGI)

Wanting to go back and start over after I had started. (Mentioned by 2 students.)
Too many explanations.
Wanted a choice not listed.
Had to sign off too soon. Wanted to question SIGI more.
I felt a bit rushed because I wanted to read everything carefully, but I knew I only had an hour (at each session), and that I should get done with a particular section before my time expired. (It took me four one-hour sessions. Most people in my class only needed three sessions.)
The prediction system didn't work properly on grade predictions for courses.
I didn't want a lot of the printouts I got. The machine automatically printed them. (Mentioned by 3 students.)
Wanted printouts of some things.
Getting repeats of printouts.
Helper never came on time.
Too slow, too many printouts.
Big mess with scheduling it, and I never finished all the way.

Question #75 (Other Steps Taken to Get More Information After Using SIGI)

Counselor. (Mentioned by 2 students.)
Sent away for information.
Taking "career choice" class.
Made use of the career center.
Wrote to the schools which had the affiliated program.

Question #82 (Additional Topics SIGI Could Have Covered)

More detailed information on careers.
Remark about other values such as home life, etc., that can add to the prediction.
I didn't answer steps 4, 5, & 6 so I really can't answer that.
It lacked some occupations I would have liked to have examined.
Prediction area needed more explanation.

Question #83 (Areas That Should Have Been Covered More Fully)[b]

Decision-making process and values section.
Prediction: It was difficult to understand its purposes, and the directions. (Mentioned by 2 students.)
Give schools listed in other states that have good programs for your field of interest.
Job opportunities in other states.
Courses in which I must enroll to prepare for an occupation.
More time to go through all the 28 occupational questions. Each session is just an hour. (Mentioned by 2 students.)
Strategy, prediction, planning.
In strategy, I wish SIGI would give fuller, better reasons for its value ratings on particular occupations.
Give more about the occupation.

Table I6 (continued)

Question #84 (Other Things Liked Best About SIGI)

That I could easily understand my values when I saw what they brought.

Mostly the fun of handling a computer since I couldn't apply the other features because of lack of values ranking.

---

[a] Some of the responses have been edited slightly.

[b] In some cases students suggested occupations or innovations already in SIGI.

Table I7

Suggestions for Improvements in SIGI Given by Experimentals in Response to Question #88[a]

I would have liked more time. I had to sign off too soon.

I would like to see more specialized occupations put into SIGI, like a certain kind of doctor or lawyer. Not just a general heading.

Good system. Needs to be geared to 4-year school and cover all the majors offered in this school. Needs to relate more to this school.

Grade B--.

(a) There should definitely be more terminals. No one should be forced to end their session in the middle of a SIGI section, (b) There should be an abort button to get out of certain parts of SIGI. I went through the same planning section twice and got duplicate printouts because they were mandatory, (c) Anyone using SIGI for a complete program should be required to talk with a counselor. This would enable the student to resolve certain conflicts which the computer cannot resolve.

Advise people about how much they will have to complete in one hour. I had no idea how the thing ran until it was all over.

Too much repetition. Could get to the point faster.

I wanted to be able to return to the compare section after finishing the planning section to ask some more questions about other occupations.

System is really great. But I had to rush, hardly read the last section. If there was only more time, I would have greatly benefitted from SIGI.

Should be offered to juniors and seniors in high school.

Reading the material was boring after two 1-hour sessions. I finished SIGI. My third time I would have liked more answers on specific questions in my major.

Time should not be limited to one-hour per visit. Should be able to see SIGI whenever you can. Some people are faster than others.

Congratulations.

(a) Make SIGI more conspicuous. I have friends who heard about SIGI, but didn't know where it was or if they could use it, since they didn't have the career choice class, (b) It was very helpful to me.

(a) SIGI was very helpful in finding out about my values. I never considered or knew how important your values were in job decision-making, (b) I enjoyed the use of SIGI and have learned a lot.

Table 17 (continued)

Enjoyed the use of SIGI and hope it works for many others.

The program was excellent.

SIGI helped me reject some occupations and consider others.

It was great and fun!

Even though I was impatient when SIGI automatically made a printout later, I found that I appreciated this reference.

(a) If the function of SIGI is to help students think about their future, become better aware of what their values are and how they rank them, and have a better idea of what direction they are facing, then I think SIGI is working (or can work), and is definitely worthwhile, (b) I don't think the SIGI program is perfect. I think that sometimes it spends too much time trying to explain something--usually through examples.... At some point a good idea would be to give the student the option of going on--to the point of the whole example (relating careers, college courses, etc.), if he feels that he understands what is going on. If he still desires some clarification and further examples, then he can continue with what SIGI is in the process of doing. This option could save some (wasted) time.

(a) A lot of the information given (by SIGI) I know I could have gotten from the various books at the Career Center. But it is easier to see the information right in front of you and be quickly found for you instead of finding the books. In that respect SIGI is a time saver. (Also) I feel confident that the information given (in SIGI) is current, whereas with books it might not be fully up to date, (b) I'm probably one of the few that (SIGI) didn't help. This is because it is hard for me to make decisions and therefore to decide the highs and lows of the different values. After I marked them the best I could for the first time I was told by SIGI that my specifications were too rigid and no occupation would fit. I know I have learned to rank my values to know what I'd like to do. I wish someone or thing could help us "mixed up ones" sort out our values so something like SIGI would help, (c) I'm not sure what I'd like to do as a job and those things I'd do on the side. (d) I don't know if SIGI could do it or not, (but I would like to) have a program designed for showing students other types of schools and their curriculum, i.e., technical schools, etc.... I can't find... A list of schools like you can for colleges and universities.... Besides technical training, where do people go who want to be, for instance, a baker?, and (e) Thank you for letting me express myself and be a part of the SIGI program.

---

[a] Some of the responses have been edited slightly.

Table 18: SIGI EVALUATION QUESTIONNAIRE FOR COUNSELORS

SIGI

BACKGROUND INFORMATION

1. What percent of your time do you spend in career counseling (as opposed to personal counseling, academic advisement, etc.)?
   0 (1) None
   12 (2) 25% or less
   1 (3) 25-50%
   0 (4) 50-75%
   0 (5) 75-100%

2. On the average, how many students do you see each week for career counseling?
   1 (1) None
   11 (2) 1-5
   0 (3) 5-10
   1 (4) 10-20
   0 (5) 20 or more

3. How long are most sessions for career counseling?
   1 (1) less that 30 minutes
   11 (2) 30 minutes to an hour
   1 (3) one to two hours

Please indicate whether you agree or disagree with each of the following statements about computer-based guidance systems.

	Agree	Disagree	Not sure
4. Computer-based guidance systems are a passing fad.	0	13	0
5. Computer-based guidance systems can relieve counselors of many routine duties, leaving more time for professional counseling activities.	12	1	0
6. Computer-based guidance systems are a potential threat to the jobs of counselors.	1	12	0
7. I will probably never make much use of computer-based guidance systems in my work with students.	0	13	0
8. Computer-based guidance systems are capable of helping students make rational career decisions.	13	0	0

EXPERIENCE WITH SIGI

9. Have you attended a SIGI Counselors' Workshop? 7 (1) Yes 6 (2) No

10. Have you had a chance to use SIGI yourself? 12 (1) Yes 1 (2) No

11. If so, which of the SIGI subsystems have you been through?

	Once	More than once
(1) VALUES	8	4
(2) LOCATE	8	3
(3) COMPARE	9	2
(4) PREDICTION	7	2
(5) PLANNING	7	2
(6) STRATEGY	6	1

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Table I8 (continued)

12. Have you referred students to SIGI? 11 (1) Yes 1 (2) No

If so, how many?_______

For what reasons?

13. How have most students at your college reacted to SIGI?
11 (1) Favorably
0 (2) Unfavorably
1 (3) No opportunity to observe

14. Have students come to you with their SIGI printouts? 10 (1) Yes 2 (2) No

What problems, if any, have you had in helping students interpret their printouts?

15. Have students come to you with problems related to use of the SIGI terminals?
3 (1) Yes 9 (2) No

If so, what kinds of problems have they encountered?

Prior to having SIGI at your college, to what degree was each of the following (Items 16-22) a problem to you in your role as a counselor?

	Major problem	Minor problem	No problem	Not relevant to me
16. Getting students to read occupational information.	4	6	1	0
17. Keeping up-to-date on occupational information.	6	4	0	0
18. Identifying sources of occupational information.	5	4	1	0
19. Finding time to see all the students who want the help of a counselor.	3	7	1	0
20. Identifying students who need help with their educational and occupational plans.	0	5	6	0
21. Selecting appropriate programs of study for students' career goals.	1	6	0	3
22. Other:				

23. Has SIGI had an impact on any of the above problems? 8 (1) Yes 0 (2) No

If so, which ones? (Circle responses.) (16) (17) (18) (19) (20) (21) (22)

Please explain: 8 7 4 4 2 3 0

Table I8 (continued)

Have you noticed a change in any of the following (Items 24-27) now that SIGI is available to students at your college?

	Increase	Decrease	No change	No opportunity to observe
24. Number of students you are able to see.	3	0	8	0
25. Amount of time you spend doing career counseling.	1	1	8	1
26. Length of career counseling sessions.	0	2	7	1
27. Quality of group discussions about values and career decisions.	8	0	0	3

28. Do you know which of your students have used SIGI and which have not?

9 (1) Yes 3 (2) No

If so, in your opinion do students who have used SIGI rate higher than students who have not used it in their ability to:

	Yes	No	No opportunity to observe
(1) express clearly the satisfactions they want from an occupation?	8	0	1
(2) state their primary occupational choice?	5	2	2
(3) mention alternative possibilities?	8	0	1
(4) indicate sound reasons for their preference?	6	0	3
(5) show they are well-informed about their first-choice occupation?	4	1	3
(6) decide what programs of study are suitable for each occupation being considered?	5	1	3
(7) evaluate their chances of success in programs being considered?	5	2	2

29. How do you think students should gain access to SIGI? (Check one or more.)

2 (1) Terminals should be available to students on a first-come, first-served basis, and follow-up sessions with counselors should be optional.

1 (2) Students should be required during their first year of college to use SIGI and schedule a follow-up session with a counselor.

10 (3) Counselors should refer students to SIGI and require a follow-up session afterward.

10 (4) SIGI should be used as part of a career guidance unit in a classroom course.

2 (5) Other: ____________________

SUGGESTIONS FOR IMPROVEMENT

30. What occupations do students frequently ask about that are missing from SIGI?

31. Are there other additional occupations that you would like to see included in SIGI?

3 (1) Yes 3 (2) No

If so, please list them: ____________________

32. Are SIGI's writing style and vocabulary appropriate for your students?

9 (1) Yes 0 (2) No

If not, what changes would you suggest? ____________________

Table I8 (continued)

33. How does the occupational information in SIGI compare to other sources available to students at your college?
10 (1) Better
1 (2) About the same
0 (3) Worse

34. Did you find any sexual, racial, or other bias in SIGI? 2 (1) Yes 10 (2) No

If so, give examples: ____________________

35. What suggestions do you have for improving SIGI, the Handbook for Counselors, or the Counselors' Workshops? ____________________

OPTIONAL INFORMATION

Members of the SIGI research staff are especially interested in hearing about any personal experiences which you or your colleagues may have had in working with SIGI. Please use the space below to record any observations, amusing anecdotes, students' comments, etc., which you would like to share with us.

Name: ____________________ College: ____________________

PLEASE RETURN YOUR QUESTIONNAIRE IN THE ENVELOPE PROVIDED

THANK YOU FOR YOUR COOPERATION

Table I9

Counselors' Responses to Open-Ended Items on the Counselors' Questionnaire[a]

Question 12 (Reasons for Referring Students to SIGI)

To familiarize him with a decision-making strategy appropriate for career choice.

Primary reason is usually value clarification. SIGI saves me the time and does a better job at that than I can usually. I never recommend the "values" subsystem by itself, however, because I find the whole program very helpful and timesaving.

To explore career options, especially in relation to choosing a major.

They were confused, uncertain of values, had limited occupational, and educational options.

Concerns associated with choice of college major.

Clarify values--find out what occupations relate to values.

For them to explore their value system and to gather basic information for career exploration purposes.

Generally these are undecided or indecisive students, usually with no declared major, freshmen or sophomores who seem to need either broadening of alternatives or narrowing and sharpening their choice processes.

Clarify values.

Career decision-making.

Adjunctive service to counselor center. Main goals were (1) value exploration--continued in counseling, (2) increase students' information about general occupational interests, and (3) specific information about ISU's curriculum--how student might do.

Question 14 (Problems Associated with Printouts)

None (2 responses).

SIGI printouts may have little impact on the dependent and indecisive student.

Inconsistences between values and jobs--says these are "my values," but I don't like the jobs that relate to them.

Too much detail.

Question 15 (Problems Associated with the Terminals)

Non-retrievable error.

We have student advisors and secretaries who take care of SIGI. I am not knowledgeable about this.

Problems with printing. Computer not operational at scheduled times.

Time out errors, can't get prints, etc.

These are referred to our people directly on site in our counseling center.

Table I9 (continued)

Question 22 (Other Problems Associated with Career Counseling

No responses.

Question 23 (Impact of SIGI on Counseling Problems)

SIGI serves to motivate students to seek additional information.

[Reference to #20]--We now offer a career development class which uses SIGI as an adjunct. We are attracting students who need help in this area, but who would be unlikely to come to the counseling center per se.

Question 29, Item 5 (Other Ways of Making SIGI Available to Students)

SIGI should be used as the basis of a "packaged" group experience--about 3 sessions running concurrently or after SIGI. The activities could be similar to those in the classroom course.

I think a combination of 3, and 4 and even 1 and 2 is appropriate. Use of SIGI should be voluntary; follow-up with counselor or group experience strongly urged if not required.

Combination.

Terminals could be available on a first-come basis with mandatory follow-up,either in a career group or with a counselor.

Question 30 (Occupations Suggested by Students for Addition to SIGI)

Wildlife conservationist, health education, additional teaching fields.

Ask more about what is available in certain fields rather than specific occupations.

Specific subfields of some of the broader occupations (e.g., psychologist).

I do not know, because I have had only minimal contact with SIGI and with students who have used SIGI.

I haven't done career counseling with enough students who have used SIGI to answer this.

Question 31 (Occupations Suggested by Counselors for Addition to SIGI)

Not aware of any yet.

Several hundred.

Specific subfield of some of the broader occupations (e.g., psychologist).

More occupations which require a 4-year degree; fewer requiring a 2-year degree.

Question 32 (Suggested Changes in Writing Style)

Reference to community college.

Even though we use SIGI with all levels at 4-year college, the vocabulary does not seem to be any problem.

Table I9 (continued)

Question 34 (Examples of Bias in SIGI)

Sexual.

More non-4-year college than 4-year college careers included; need to expand options further.

None that has been detrimental. I have talked with clients about sex bias in occupational fields as a result of career exploration, however.

Question 35 (Suggestions for Improvement)

SIGI--add significant number of occupations.

None at the moment. I may have after more experience with SIGI.

Have not seen Handbook or attended workshops. I don't know if it's feasible to change, but I found the program somewhat repetitious when I recycled through various sections, with some information appearing again and again. Maybe this could be short-cutted.

I need more exposure to it in my work before I could offer help in the improvement area. I am really pleased with our progress with it. I plan to help teach our Career Choice class next semester. That should give me an intense experience with SIGI's use.

I have not seen the handbook nor have I been to an ETS workshop. I did attend training sessions sponsored by the staff working with SIGI here at ISU. The major in-house need is for additional terminals. The flow of users is high, and there is little opportunity to expand without further terminal space. (Obviously, this is an internal budget matter but it does affect the use and number of referrals to SIGI; why refer a student if there is no time to use it?

Optional Information

I enjoyed the values section. Students stick with the package--there seem to be few dropouts. I haven't had much contact with SIGI so can't be specific here; I have heard that students like it.

I work with SIGI and career exploration on a somewhat limited basis. I believe Don Cochran and our staff have done an excellent job in developing career development experiences to cover a broad range of student-career difficulties. I am sure he and our staff will continue to do a creative job in using SIGI in our total career development program.

One student, in playing around with the Prediction system, said that he found the prediction for a course was entirely based only on his prediction of his own success. I don't know if this was supposed to be true or not, but I thought that various factors were combined in predicting grades.

"It really is a relief to have some confirmation that I'm heading in the right direction."--ISU junior planning on graduate school but wondering if he was making an appropriate choice; "It really opens up possibilities I hadn't even considered for myself."--ISU sophomore. [After quoting these students, the counselor continued.] SIGI has made career counseling more enjoyable for me because I disliked having to do #16, 17, and 18. I found repeated routine value clarification boring. I'm a clinical psychologist who prefers to keep up to date on that litera-

Table I9 (continued)

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ture and who prefers to help clients deal with the more complex matters than what a certain occupation has to offer, per se. Once the client has that information, for instance, I can enjoy helping the person look more in depth as to how that occupation might relate to his needs and limitations, etc. I would not want to do career counseling without SIGI now. I'm spoiled!

---

[a] Some of the responses have been edited slightly.

Table I10

Breakdown of Sample by Age, Sex, and Enrollment Status

Factor	%
Age	
18 or under	49.9
19-21	33.6
22-24	7.4
25 or over	9.1
Sex	
Male	39.4
Female	60.6
Enrollment status	
About to enter	5.4
1st semester or quarter	36.5
Completed 1 or more semester	50.7
Other	7.4

Table Ill

Initial Status with Respect to Career Decisions

VALUE STATUS (N= 507)	FREQ	%
I KNOW WHAT I WANT.	90	17.75
GENERAL IDEA OF WHAT I WANT.	295	58.19
WOULD KNOW IF I SAW IT.	55	10.85
I'M IN THE DARK.	67	13.21

OCCUPATION STATUS (N= 507)	FREQ	%
I CAN LIST 3 OCCUPATIONS.	36	7.10
1 OR 2 OCCUPATIONS THAT FIT.	74	14.60
NOT SURE THEY FIT MY VALUES.	121	23.87
I NEED LOTS OF INFORMATION.	276	54.44

PREDICTION STATUS (N= 507)	FREQ	%
PREDICT GRADES IN ANY PROGRAM.	155	30.57
PREDICT GRADES IN SOME PROGRAMS.	215	42.41
GENERAL IDEA OF MY GRADES.	103	20.32
I CAN'T PREDICT MY GRADES.	34	6.71

PLANNING STATUS (N= 507)	FREQ	%
KNOW WHICH PROGRAM TO ENROLL IN.	73	14.40
GENERAL IDEA WHICH IS BEST.	188	37.08
DON'T KNOW WHICH PROG. TO TAKE.	246	48.52

Table I12

Means and Standard Deviations for the 10 SIGI Values

	Unrestricted[a]		Restricted[b]	
Value	$\overline{X}$	S.D.	$\overline{X}$	S.D.
Income	4.92	1.66	4.52	1.61
Prestige	4.04	1.87	3.09	1.55
Independence	4.96	1.62	4.25	1.54
Helping Others	5.30	2.16	4.70	2.20
Security	5.22	1.81	4.47	1.66
Variety	5.30	1.74	4.67	1.63
Leadership	3.94	1.83	3.24	1.58
Interest Field	5.86	1.62	5.53	1.58
Leisure	4.20	1.69	3.56	1.51
Early Entry	2.75	1.97	1.96	1.63

[a] Students weighted each value on a scale ranging from 0 (no importance) to 8 (maximum importance), with no restriction on the magnitude of the sum of the weights.

[b] Students were forced to adjust their value weights to sum to exactly 40 points.

Table I13

Frequency with Which Each of the Six Interest Fields Was Selected

Interest Field (N = 856[a])	Freq[a]	%
Scientific	118	13.79
Technological	40	4.67
Administrative	104	12.15
Personal Contact	341	39.84
Verbal	179	20.91
Aesthetic	74	8.64

[a] The n and frequency represent the number of times fields were selected. Students may choose more than once.

Table I14

Frequency with Which Values Were Used for Retrieval in Locate

VALUES IN LOCATE (N= 12365[a])	FREQ	%
INCOME.	1632	13.20
PRESTIGE.	697	5.64
INDEPENDENCE.	1505	12.17
HELPING OTHERS.	1535	12.41
SECURITY.	1416	11.45
VARIETY.	1666	13.47
LEADERSHIP.	733	5.93
INTEREST FIELD.	1909	15.44
LEISURE.	897	7.25
EARLY ENTRY.	375	3.03

---

[a] The n represents the total number of selections, not the number of students using the Locate system.

Table I15

Level or Category of Specification Used in Locate

INCOME LEVEL SPECS (N= 1691)	FREQ	%
LESS THAN $8,000 IS OK.	40	2.37
MORE THAN $8,000.	268	15.85
MORE THAN $11,000.	699	41.34
MORE THAN $15,000.	490	28.98
MORE THAN $20,000.	194	11.47

PRESTIGE LEVEL SPECS (N= 723)	FREQ	%
BELOW AVERAGE IS OK.	29	4.01
AVERAGE AMOUNT.	305	42.19
MORE THAN AVERAGE AMOUNT.	296	40.94
GREAT AMOUNT	93	12.86

INDEPENDENCE LEVEL SPECS (N= 1543)	FREQ	%
BELOW AVERAGE IS OK.	69	4.47
AVERAGE AMOUNT.	483	31.30
MORE THAN AVERAGE AMOUNT.	789	51.13
GREAT AMOUNT	202	13.09

HELPING OTHERS LEVEL SPECS (N= 1588)	FREQ	%
BELOW AVERAGE IS OK.	78	4.91
AVERAGE AMOUNT.	265	16.69
MORE THAN AVERAGE AMOUNT.	569	35.83
GREAT AMOUNT	676	42.57

SECURITY LEVEL SPECS (N= 1432)	FREQ	%
BELOW AVERAGE IS OK.	49	3.42
AVERAGE AMOUNT.	561	39.18
MORE THAN AVERAGE AMOUNT.	620	43.30
GREAT AMOUNT	202	14.11

VARIETY LEVEL SPECS (N= 1712)	FREQ	%
BELOW AVERAGE IS OK.	33	1.93
AVERAGE AMOUNT.	431	25.18
MORE THAN AVERAGE AMOUNT.	846	49.42
GREAT AMOUNT	402	23.48

LEADERSHIP LEVEL SPECS (N= 765)	FREQ	%
BELOW AVERAGE IS OK.	31	4.05
AVERAGE AMOUNT.	261	34.12
MORE THAN AVERAGE AMOUNT.	339	44.31
GREAT AMOUNT	134	17.52

Table I15 (continued)

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INTEREST FIELD SPECS (N= 1953 )          FREQ          %
                                         ----          -
   SCIENTIFIC.                            234      11.98
   TECHNOLOGICAL.                          70       3.58
   ADMINISTRATIVE.                        236      12.08
   PERSONAL CONTACT.                     1039      53.20
   VERBAL.                                205      10.50
   AESTHETIC.                             169       8.65

LEISURE LEVEL SPECS (N= 920 )            FREQ          %
                                         ----          -
   SMALL AMOUNT IS OK.                     24       2.61
   LESS THAN AVERAGE AMOUNT.               89       9.67
   AVERAGE AMOUNT                         577      62.72
   MORE THAN AVERAGE AMOUNT.              230      25.00

EARLY ENTRY LEVEL SPECS (N= 388 )        FREQ          %
                                         ----          -
   5 OR MORE YEARS.                        75      19.33
   4 YEARS.                               258      66.49
   2 OR 3 YEARS.                           50      12.89
   1 YEAR OR LESS.                          5       1.29
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Table I16

OCCUPATIONS IN LOCATE-NOVICE & INITIATE (N= 11320^a& 1484^b)

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	1	0.01	0	0.00
ADVERTISING COPYWRITER.	11	0.10	3	0.20
AIR COND, REFRIG, & HEAT MECH.	3	0.03	2	0.13
ACCOUNTANT.	5	0.04	1	0.07
AIRCRAFT MECHANIC.	3	0.03	0	0.00
APPLIANCE REPAIR TECHNICIAN.	0	0.00	0	0.00
ARCHITECT.	69	0.61	4	0.27
AUTOMOBILE SALESWORKER.	0	0.00	0	0.00
ARCH. TECH. AND DRAFTSMAN.	3	0.03	0	0.00
AVIONICS TECHNICIAN.	2	0.02	0	0.00
AUTOMOBILE MECHANIC.	0	0.00	0	0.00
ACTUARY.	42	0.37	3	0.20
BROADCAST TECHNICIAN.	10	0.09	0	0.00
BEAUTICIAN.	3	0.03	0	0.00
BOTANIST.	54	0.48	8	0.54
BOOKKEEPER.	0	0.00	0	0.00
BUSINESS MACHINE REPAIR TECH.	7	0.06	1	0.07
BANK OFFICER.	135	1.19	15	1.01
BANK TELLER.	1	0.01	0	0.00
COMMERCIAL ARTIST.	2	0.02	0	0.00
CLOTHING DESIGNER.	28	0.25	2	0.13
CHEMICAL ENGINEER.	82	0.72	10	0.67
CHEMIST.	9	0.08	0	0.00
CLERGY.	163	1.44	20	1.35
COMPUTER OPERATOR.	0	0.00	2	0.13
COMPUTER PROGRAMMER.	8	0.07	1	0.07
CIVIL ENGINEER.	251	2.22	43	2.90
DENTAL ASSISTANT	1	0.01	0	0.00
DENTIST	365	3.22	39	2.63
DENTAL HYGIENIST	5	0.04	0	0.00
DRAFTERSMAN	9	0.08	2	0.13
DIETITIAN	98	0.87	12	0.81
DIESEL MECHANIC	3	0.03	0	0.00
DANCER AND DANCING TEACHER	0	0.00	0	0.00
ECONOMIST	34	0.30	1	0.07
ELECTRICAL ENGINEER	49	0.43	5	0.34
ENGINEERING TECHNICIAN	4	0.04	1	0.07
ELECTRONICS TECHNICIAN	15	0.13	1	0.07
FINE ARTIST/PRIVATE ART TEACHER	14	0.12	1	0.07
FUNERAL DIRECTOR	134	1.18	16	1.08
FLIGHT ENGINEER	35	0.31	4	0.27
FLIGHT ATTENDANT	5	0.04	1	0.07
FORESTER	161	1.42	12	0.81
GEOGRAPHER	15	0.13	2	0.13
HOME ECONOMIST	248	2.19	17	1.15
HOTEL/MOTEL MANAGER	55	0.49	14	0.94
INSURANCE AGENT	19	0.17	4	0.27
INTERIOR DESIGNER/DECORATOR	35	0.31	3	0.20
INDUSTRIAL ENGINEER	240	2.12	30	2.02
INDUSTRIAL TRAFFIC MANAGER	19	0.17	3	0.20
INDUSTRIAL DESIGNER	98	0.87	4	0.27
INSTRUMENT REPAIR TECHNICIAN	0	0.00	0	0.00
SCIENCE LAB TECHNICIAN	0	0.00	0	0.00
LIBRARIAN	149	1.32	8	0.54
LABOR RELATIONS SPECIALIST	131	1.16	6	0.40
LIBRARY TECHNICIAN	1	0.01	2	0.13

Table 116 (continued)

LAWYER	475	4.20	40	2.70
MATHEMATICIAN	57	0.50	8	0.54
PHYSICIAN	393	3.47	45	3.03
MECHANICAL ENGINEER	76	0.67	9	0.61
METEOROLOGIST	46	0.41	4	0.27
MEDICAL RECORD ADMINISTRATOR	23	0.20	7	0.47
MEDICAL LAB TECHNICIAN	0	0.00	0	0.00
MODEL	0	0.00	2	0.13
MARKET RESEARCHER	6	0.05	4	0.27
MANUFACTURER'S SALESWORKER.	6	0.05	3	0.20
MEDICAL TECHNOLOGIST.	11	0.10	3	0.20
MUSICIAN/MUSIC TEACHER.	13	0.11	3	0.20
MACHINIST.	7	0.06	1	0.07
NURSERYMAN/LANDSCAPER.	17	0.15	1	0.07
NEWSPAPER REPORTER.	8	0.07	1	0.07
OCEANOGRAPHER.	71	0.63	8	0.54
OPTICIAN.	0	0.00	0	0.00
OCCUPATIONAL THERAPIST.	271	2.39	29	1.95
PURCHASING AGENT.	5	0.04	1	0.07
POLICE OFFICER.	10	0.09	2	0.13
PUBLIC HEALTH SPECIALITST.	210	1.86	13	0.88
PILOT.	33	0.29	6	0.40
POLITICAL SCIENTIST.	163	1.44	50	3.37
PHARMACIST.	22	0.19	3	0.20
NURSE, PRACTICAL.	1	0.01	0	0.00
PHOTOGRAPHER.	18	0.16	0	0.00
PUBLIC RELATIONS WORKER.	13	0.11	4	0.27
PHYSICIST.	5	0.04	0	0.00
PHYSICAL THERAPIST.	71	0.63	14	0.94
PERSONNEL INTERVIEWER.	163	1.44	17	1.15
PRODUCTION MANAGER.	88	0.78	11	0.74
PSYCHOLOGIST.	440	3.89	54	3.64
RADIO/TV ANNOUNCER.	7	0.06	0	0.00
REHABILITATION COUNSELOR.	446	3.94	39	2.63
RECEPTIONIST.	3	0.03	0	0.00
REAL ESTATE AGENT	3	0.03	1	0.07
NURSE, REGISTERED.	33	0.29	1	0.07
RESPIRATORY THERAPIST.	13	0.11	3	0.20
RETAIL STORE MANAGER.	19	0.17	2	0.13
RADIO/TV SERVICE TECHNICIAN.	0	0.00	0	0.00
RECREATION WORKER.	97	0.86	5	0.34
SYSTEMS ANALYST	32	0.28	5	0.34
SOIL CONSERVATIONIST.	222	1.96	23	1.55
SECURITIES BROKER.	45	0.42	8	0.54
SECRETARY.	12	0.11	5	0.34
SCHOOL COUNSELOR.	494	4.36	82	5.53
STATISTICIAN.	22	0.19	4	0.27
SOCIAL SERVICE AIDE.	25	0.22	1	0.07
SPEECH PATHOLOGIST/AUDIOLOGIST.	445	3.93	80	5.39
SINGER AND SINGING TEACHER.	5	0.04	0	0.00
SURVEYOR.	8	0.07	0	0.00
SOCIAL WORKER.	121	1.07	6	0.40
TEACHER AIDE.	8	0.07	0	0.00
TELEPHONE CRAFTSWORKER.	0	0.00	0	0.00
TOOL AND DIE MAKER.	3	0.03	0	0.00
TEACHER, ELEMENTARY SCHOOL	180	1.59	31	2.09
ZOOLOGIST.	54	0.48	8	0.54
TECHNICAL WRITER.	6	0.05	0	0.00
TYPIST.	1	0.01	0	0.00
URBAN PLANNER.	200	1.77	14	0.94

Table I16 (continued)

VETERINARIAN.	93	0.82	17	1.15
WASTEWATER TREATMENT OPERATOR.	4	0.04	0	0.00
X-RAY TECHNOLOGIST.	2	0.02	0	0.00
TEACHER, ART.	276	2.44	34	2.29
TEACHER, BIOLOGY.	262	2.31	40	2.70
TEACHER, BUSINESS.	254	2.24	44	2.96
TEACHER, ENGLISH/LANG. ARTS.	209	1.85	33	2.22
TEACHER, FOREIGN LANGUAGE.	209	1.85	33	2.22
TEACHER, HISTORY/SOCIAL STUDIES.	209	1.85	33	2.22
TEACHER, INDUS. ARTS/VOC.TECH.	170	1.50	34	2.29
TEACHER, MATHEMATICS.	262	2.31	40	2.70
TEACHER, PHYSICAL EDUCATION.	155	1.37	28	1.89
TEACHER, PHYSICAL SCIENCE.	262	2.31	40	2.70
WELDER.	0	0.00	0	0.00
AEROSPACE ENGINEER.	5	0.04	0	0.00
FIREFIGHTER.	12	0.11	1	0.07
KEYPUNCH OPERATOR.	0	0.00	0	0.00
LANDSCAPE ARCHITECT.	84	0.74	5	0.34
OPERATING ROOM TECHNICIAN.	0	0.00	0	0.00
OPTOMETRIST.	170	1.50	51	3.44
TEACHER, EARLY CHILDHOOD.	60	0.53	23	1.55
TEACHER, SPECIAL EDUCATION.	209	1.85	33	2.22
CONSTRUCTION INSPECTOR.	22	0.19	0	0.00
CORRECTION OFFICER.	0	0.00	0	0.00
GEOLOGIST.	22	0.19	5	0.34
HOSPITAL ADMINISTRATOR.	88	0.78	13	0.88
PHYSICIAN'S ASSISTANT.	60	0.53	3	0.20
STENOGRAPHER.	0	0.00	0	0.00
EEG TECHNOLOGIST.	0	0.00	0	0.00
NURSING ASSISTANT.	0	0.00	0	0.00
FLORIST (RETAIL & DESIGNER).	1	0.01	0	0.00
TEACHER, VOCATIONAL/TECHNICAL.	49	0.43	1	0.07
CHEF/COOK.	4	0.04	1	0.07
PLUMBER.	21	0.19	1	0.07
FOOD SCIENTIST/TECHNOLOGIST.	27	0.24	5	0.34
TELEVISION PRODUCER/DIRECTOR.	7	0.06	1	0.07
INTERPRETER/TRANSLATOR.	32	0.28	0	0.00
LEGAL ASSISTANT.	10	0.09	0	0.00
FARMER/FARM MANAGER.	8	0.07	1	0.07

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[a] Retrievals for novices.

[b] Retrievals for initiates.

Table I17

OCCUPATIONS IN COMPARE (N= 3612[a])	FREQ	%
ACTOR AND ACTRESS.	20	0.55
ADVERTISING COPYWRITER.	29	0.80
AIR COND, REFRIG, & HEAT MECH.	1	0.03
ACCOUNTANT.	38	1.05
AIRCRAFT MECHANIC.	3	0.08
APPLIANCE REPAIR TECHNICIAN.	1	0.03
ARCHITECT.	30	0.83
AUTOMOBILE SALESWORKER.	4	0.11
ARCH. TECH. AND DRAFTSMAN.	3	0.08
AVIONICS TECHNICIAN.	0	0.00
AUTOMOBILE MECHANIC.	7	0.19
ACTUARY.	28	0.78
BROADCAST TECHNICIAN.	6	0.17
BEAUTICIAN.	6	0.17
BOTANIST.	21	0.58
BOOKKEEPER.	7	0.19
BUSINESS MACHINE REPAIR TECH.	3	0.08
BANK OFFICER.	39	1.08
BANK TELLER.	6	0.17
COMMERCIAL ARTIST.	21	0.58
CLOTHING DESIGNER.	16	0.44
CHEMICAL ENGINEER.	16	0.44
CHEMIST.	13	0.36
CLERGY.	30	0.83
COMPUTER OPERATOR.	22	0.61
COMPUTER PROGRAMMER.	31	0.86
CIVIL ENGINEER.	48	1.33
DENTAL ASSISTANT	11	0.30
DENTIST	24	0.66
DENTAL HYGIENIST	8	0.22
DRAFTERSMAN	8	0.22
DIETITIAN	31	0.86
DIESEL MECHANIC	2	0.06
DANCER AND DANCING TEACHER	10	0.28
ECONOMIST	21	0.58
ELECTRICAL ENGINEER	11	0.30
ENGINEERING TECHNICIAN	2	0.06
ELECTRONICS TECHNICIAN	10	0.28
FINE ARTIST/PRIVATE ART TEACHER	23	0.64
FUNERAL DIRECTOR	19	0.53
FLIGHT ENGINEER	8	0.22
FLIGHT ATTENDANT	42	1.16
FORESTER	63	1.74
GEOGRAPHER	5	0.14
HOME ECONOMIST	62	1.72
HOTEL/MOTEL MANAGER	26	0.72
INSURANCE AGENT	9	0.25
INTERIOR DESIGNER/DECORATOR	44	1.22
INDUSTRIAL ENGINEER	42	1.16
INDUSTRIAL TRAFFIC MANAGER	5	0.14
INDUSTRIAL DESIGNER	23	0.64
INSTRUMENT REPAIR TECHNICIAN	0	0.00
SCIENCE LAB TECHNICIAN	5	0.14
LIBRARIAN	22	0.61
LABOR RELATIONS SPECIALIST	35	0.97
LIBRARY TECHNICIAN	3	0.08

Table 117 (continued)

LAWYER	123	3.41
MATHEMATICIAN	10	0.28
PHYSICIAN	47	1.30
MECHANICAL ENGINEER	16	0.44
METEOROLOGIST	16	0.44
MEDICAL RECORD ADMINISTRATOR	21	0.58
MEDICAL LAB TECHNICIAN	12	0.33
MODEL	13	0.36
MARKET RESEARCHER	11	0.30
MANUFACTURER'S SALESWORKER.	1	0.03
MEDICAL TECHNOLOGIST.	19	0.53
MUSICIAN/MUSIC TEACHER.	20	0.55
MACHINIST.	4	0.11
NURSERYMAN/LANDSCAPER.	8	0.22
NEWSPAPER REPORTER.	35	0.97
OCEANOGRAPHER.	25	0.69
OPTICIAN.	0	0.00
OCCUPATIONAL THERAPIST.	87	2.41
PURCHASING AGENT.	30	0.83
POLICE OFFICER.	26	0.72
PUBLIC HEALTH SPECIALITST.	61	1.69
PILOT.	36	1.00
POLITICAL SCIENTIST.	37	1.02
PHARMACIST.	15	0.42
NURSE, PRACTICAL.	8	0.22
PHOTOGRAPHER.	40	1.11
PUBLIC RELATIONS WORKER.	51	1.41
PHYSICIST.	10	0.28
PHYSICAL THERAPIST.	37	1.02
PERSONNEL INTERVIEWER.	62	1.72
PRODUCTION MANAGER.	34	0.94
PSYCHOLOGIST.	182	5.04
RADIO/TV ANNOUNCER.	28	0.78
REHABILITATION COUNSELOR.	151	4.18
RECEPTIONIST.	6	0.17
REAL ESTATE AGENT	10	0.28
NURSE, REGISTERED.	29	0.80
RESPIRATORY THERAPIST.	7	0.19
RETAIL STORE MANAGER.	17	0.47
RADIO/TV SERVICE TECHNICIAN.	3	0.08
RECREATION WORKER.	50	1.38
SYSTEMS ANALYST	22	0.61
SOIL CONSERVATIONIST.	45	1.25
SECURITIES BROKER.	27	0.75
SECRETARY.	20	0.55
SCHOOL COUNSELOR.	174	4.82
STATISTICIAN.	9	0.25
SOCIAL SERVICE AIDE.	22	0.61
SPEECH PATHOLOGIST/AUDIOLOGIST.	76	2.10
SINGER AND SINGING TEACHER.	9	0.25
SURVEYOR.	1	0.03
SOCIAL WORKER.	90	2.49
TEACHER AIDE.	1	0.03
TELEPHONE CRAFTSWORKER.	1	0.03
TOOL AND DIE MAKER.	3	0.08
TEACHER, ELEMENTARY SCHOOL	74	2.05
ZOOLOGIST.	24	0.66
TECHNICAL WRITER.	11	0.30
TYPIST.	1	0.03
URBAN PLANNER.	45	1.25

Table I17 (continued)

VETERINARIAN.	17	0.47
WASTEWATER TREATMENT OPERATOR.	1	0.03
X-RAY TECHNOLOGIST.	15	0.42
TEACHER, ART.	41	1.14
TEACHER, BIOLOGY.	7	0.19
TEACHER, BUSINESS.	21	0.58
TEACHER, ENGLISH/LANG. ARTS.	27	0.75
TEACHER, FOREIGN LANGUAGE.	8	0.22
TEACHER, HISTORY/SOCIAL STUDIES.	16	0.44
TEACHER, INDUS. ARTS/VOC.TECH.	9	0.25
TEACHER, MATHEMATICS.	16	0.44
TEACHER, PHYSICAL EDUCATION.	29	0.80
TEACHER, PHYSICAL SCIENCE.	4	0.11
WELDER.	0	0.00
AEROSPACE ENGINEER.	3	0.03
FIREFIGHTER.	6	0.17
KEYPUNCH OPERATOR.	7	0.19
LANDSCAPE ARCHITECT.	21	0.58
OPERATING ROOM TECHNICIAN.	3	0.06
OPTOMETRIST.	29	0.80
TEACHER, EARLY CHILDHOOD.	40	1.11
TEACHER, SPECIAL EDUCATION.	59	1.63
CONSTRUCTION INSPECTOR.	3	0.03
CORRECTION OFFICER.	40	1.11
GEOLOGIST.	14	0.39
HOSPITAL ADMINISTRATOR.	31	0.86
PHYSICIAN'S ASSISTANT.	19	0.53
STENOGRAPHER.	10	0.28
EEG TECHNOLOGIST.	1	0.03
NURSING ASSISTANT.	1	0.03
FLORIST (RETAIL & DESIGNER).	2	0.06
TEACHER, VOCATIONAL/TECHNICAL.	5	0.14
CHEF/COOK.	2	0.06
PLUMBER.	3	0.08
FOOD SCIENTIST/TECHNOLOGIST.	5	0.14
TELEVISION PRODUCER/DIRECTOR.	1	0.03
INTERPRETER/TRANSLATOR.	9	0.25
LEGAL ASSISTANT.	8	0.22
FARMER/FARM MANAGER.	3	0.08

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[a] Frequency indicates the total number of times an occupation was selected as a subject for inquiry by novices and initiates.

Table I18

QUESTIONS IN COMPARE (N= 7944[a])	FREQ	%
DEFINITION OF OCCUPATION?	593	7.46
DESCRIPTION OF WORK ACTIVITIES?	697	8.77
LEVELS OF SKILLS?	276	3.47
WHERE TO GET MORE INFORMATION?	239	3.01
EDUCATION REQUIRED-EARLY ENTRY?	492	6.19
SPECIFIC OCCUPATIONAL TRAINING?	248	3.12
RELATED COLLEGE COURSES?	450	5.66
PERSONAL QUALIFICATIONS?	428	5.39
OTHER REQUIREMENTS?	160	2.01
BEGINNING SALARY?	422	5.31
AVERAGE INCOME-HIGH INCOME?	361	4.54
TOP SALARY POSSIBILITIES?	196	2.47
HOW SALARIES VARY?	110	1.38
OPPORTUNITIES TO HELP OTHERS?	193	2.43
OPPORTUNITIES FOR LEADERSHIP?	68	0.86
WHAT FIELDS OF INTEREST?	272	3.42
PRESTIGE LEVEL?	76	0.96
SPECIAL PROBLEMS?	253	3.18
PHYSICAL SURROUNDINGS?	158	1.99
LEISURE-HOURS?	260	3.27
INDEPENDENCE ON THE JOB?	177	2.23
VARIETY?	235	2.96
FRINGE BENEFITS?	146	1.84
EMPLOYMENT OUTLOOK?	552	6.95
WHERE ARE THE JOBS?	371	4.67
JOB SECURITY?	196	2.47
ADVANCEMENT?	159	2.00
HOW MANY WOMEN?	156	1.96

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[a] Frequency is the total number of times the question was chosen by novices and initiates.

Table I19

Students' Reports of Their Previous Academic Performance

H.S.RANK (N= 375)	FREQ	%
TOP FIFTH.	104	27.73
2ND FIFTH.	160	42.67
3RD FIFTH.	96	25.60
4TH FIFTH.	11	2.93
BOTTOM FIFTH.	4	1.07

H.S.MATH GRADES (N= 374)	FREQ	%
MOSTLY A'S.	66	17.65
MOSTLY B'S.	159	42.51
MOSTLY C'S.	125	33.42
BELOW C.	24	6.42

H.S.ENGLISH GRADES (N= 372)	FREQ	%
MOSTLY A'S.	153	41.13
MOSTLY B'S.	164	44.09
MOSTLY C'S.	50	13.44
BELOW C.	5	1.34

HELP WITH ENGLISH (N= 372)	FREQ	%
YES.	66	17.74
NO.	217	58.33
NOT SURE.	89	23.92

Table I20

Programs Chosen in Prediction (N = 1022[a])

	FREQ	%
Agriculture	28	2.74
Art	44	4.30
Biological Sciences	79	7.73
Business Administration	91	8.90
Business Education	11	1.08
Chemistry	6	.59
Distributive Education	8	.78
English	69	6.75
French	5	.49
General Business	16	1.57
Geology	3	.29
German	7	.68
Health & Phys Ed-Men	36	3.52
History	36	3.52
Home Economics	14	1.37
Industrial Technology	31	3.03
Library Science	6	5.87
Mass Communication	56	5.48
Medical Records Administration	41	4.01
Medical Technology	45	4.40
Music	49	4.79
Philosophy	29	2.84
Physics	29	2.84
Political Science	14	1.37
Psychology	154	15.07
Recreation & Park Administration	20	1.96
Russian	2	.20
Secretarial Education	6	.59
Spanish	8	.78
Special Education	76	7.44
Theatre	3	.29

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[a] The n represents the sum of the individual frequencies, not students.

Table I21

QUESTIONS IN PREDICTION (N= 175)	FREQ ----	% -
CHANCES IN 100 MEAN?	31	17.71
CHANCES OF PASSING COURSE?	25	14.29
HOW TO PREDICT GRADE.	34	19.43
CHANCES GOOD OR BAD.	37	21.14
SIGI RIGHT OR AM I RIGHT?	48	27.43

Table I22

1ST CHOICE OCCUPATION IN STRATEGY-PRE[a] & POST[b] (N= 525 & 480)

	FREQ	%	FREQ	%
ADVERTISING COPYWRITER.	8	1.52	2	0.42
AIR COND, REFRIG, & HEAT MECH.	0	0.00	0	0.00
ACCOUNTANT.	10	1.90	10	2.08
AIRCRAFT MECHANIC.	0	0.00	0	0.00
APPLIANCE REPAIR TECHNICIAN.	0	0.00	0	0.00
ARCHITECT.	3	0.57	1	0.21
AUTOMOBILE SALESWORKER.	0	0.00	0	0.00
ARCH. TECH. AND DRAFTSMAN.	0	0.00	0	0.00
AVIONICS TECHNICIAN.	0	0.00	0	0.00
AUTOMOBILE MECHANIC.	2	0.38	1	0.21
ACTUARY.	4	0.76	2	0.42
BROADCAST TECHNICIAN.	3	0.57	2	0.42
BEAUTICIAN.	1	0.19	1	0.21
BOTANIST.	3	0.57	4	0.83
BOOKKEEPER.	0	0.00	0	0.00
BUSINESS MACHINE REPAIR TECH.	0	0.00	0	0.00
BANK OFFICER.	10	1.90	9	1.83
BANK TELLER.	0	0.00	1	0.21
COMMERCIAL ARTIST.	6	1.14	0	0.00
CLOTHING DESIGNER.	4	0.76	2	0.42
CHEMICAL ENGINEER.	0	0.00	0	0.00
CHEMIST.	2	0.38	0	0.00
CLERGY.	5	0.95	3	0.63
COMPUTER OPERATOR.	0	0.00	0	0.00
COMPUTER PROGRAMMER.	6	1.14	2	0.42
CIVIL ENGINEER.	2	0.38	3	0.63
DENTAL ASSISTANT	2	0.38	2	0.42
DENTIST	0	0.00	0	0.00
DENTAL HYGIENIST	0	0.00	0	0.00
DRAFTERSMAN	0	0.00	0	0.00
DIETITIAN	3	0.57	3	0.63
DIESEL MECHANIC	2	0.38	0	0.00
DANCER AND DANCING TEACHER	2	0.38	0	0.00
ECONOMIST	1	0.19	1	0.21
ELECTRICAL ENGINEER	0	0.00	0	0.00
ENGINEERING TECHNICIAN	0	0.00	0	0.00
ELECTRONICS TECHNICIAN	2	0.38	1	0.21
FINE ARTIST/PRIVATE ART TEACHER	2	0.38	2	0.42
FUNERAL DIRECTOR	1	0.19	1	0.21
FLIGHT ENGINEER	0	0.00	0	0.00
FLIGHT ATTENDANT	18	3.43	10	2.08
FORESTER	11	2.10	12	2.50
GEOGRAPHER	0	0.00	0	0.00
HOME ECONOMIST	9	1.71	8	1.67
HOTEL/MOTEL MANAGER	6	1.14	5	1.04
INSURANCE AGENT	2	0.38	0	0.00
INTERIOR DESIGNER/DECORATOR	2	0.38	1	0.21
INDUSTRIAL ENGINEER	4	0.76	3	0.63
INDUSTRIAL TRAFFIC MANAGER	1	0.19	0	0.00
INDUSTRIAL DESIGNER	1	0.19	0	0.00
INSTRUMENT REPAIR TECHNICIAN	0	0.00	0	0.00
SCIENCE LAB TECHNICIAN	1	0.19	1	0.21
LIBRARIAN	1	0.19	1	0.21
LABOR RELATIONS SPECIALIST	3	0.57	3	0.63
LIBRARY TECHNICIAN	1	0.19	2	0.42
LAWYER	23	4.38	25	5.21
MATHEMATICIAN	2	0.38	0	0.00

Table I22 (continued)

PHYSICIAN	6	1.14	5	1.04
MECHANICAL ENGINEER	3	0.57	4	0.83
METEOROLOGIST	1	0.19	0	0.00
MEDICAL RECORD ADMINISTRATOR	5	0.95	4	0.83
MEDICAL LAB TECHNICIAN	0	0.00	0	0.00
MODEL	1	0.19	0	0.00
MARKET RESEARCHER	2	0.38	1	0.21
MANUFACTURER'S SALESWORKER.	3	0.57	2	0.42
MEDICAL TECHNOLOGIST.	1	0.19	1	0.21
MUSICIAN/MUSIC TEACHER.	10	1.90	4	0.83
MACHINIST.	0	0.00	0	0.00
NURSERYMAN/LANDSCAPER.	0	0.00	0	0.00
NEWSPAPER REPORTER.	2	0.38	2	0.42
OCEANOGRAPHER.	5	0.95	4	0.83
OPTICIAN.	0	0.00	0	0.00
OCCUPATIONAL THERAPIST.	4	0.76	5	1.04
PURCHASING AGENT.	6	1.14	1	0.21
POLICE OFFICER.	4	0.76	4	0.83
PUBLIC HEALTH SPECIALITST.	3	0.57	3	0.63
PILOT.	4	0.76	4	0.83
POLITICAL SCIENTIST.	8	1.52	10	2.08
PHARMACIST.	1	0.19	0	0.00
NURSE, PRACTICAL.	0	0.00	2	0.42
PHOTOGRAPHER.	6	1.14	5	1.04
PUBLIC RELATIONS WORKER.	8	1.52	4	0.83
PHYSICIST.	2	0.38	2	0.42
PHYSICAL THERAPIST.	7	1.33	5	1.04
PERSONNEL INTERVIEWER.	4	0.76	7	1.46
PRODUCTION MANAGER.	1	0.19	4	0.83
PSYCHOLOGIST.	44	8.38	40	8.33
RADIO/TV ANNOUNCER.	4	0.76	3	0.63
REHABILITATION COUNSELOR.	8	1.52	18	3.75
RECEPTIONIST.	0	0.00	0	0.00
REAL ESTATE AGENT	3	0.57	1	0.21
NURSE, REGISTERED.	9	1.71	6	1.25
RESPIRATORY THERAPIST.	0	0.00	0	0.00
RETAIL STORE MANAGER.	9	1.71	10	2.08
RADIO/TV SERVICE TECHNICIAN.	0	0.00	0	0.00
RECREATION WORKER.	9	1.71	9	1.88
SYSTEMS ANALYST	3	0.57	1	0.21
SOIL CONSERVATIONIST.	5	0.95	4	0.83
SECURITIES BROKER.	3	0.57	1	0.21
SECRETARY.	7	1.33	7	1.46
SCHOOL COUNSELOR.	26	4.95	27	5.63
STATISTICIAN.	0	0.00	0	0.00
SOCIAL SERVICE AIDE.	1	0.19	1	0.21
SPEECH PATHOLOGIST/AUDIOLOGIST.	8	1.52	10	2.08
SINGER AND SINGING TEACHER.	0	0.00	0	0.00
SURVEYOR.	0	0.00	0	0.00
SOCIAL WORKER.	21	4.00	15	3.13
TEACHER AIDE.	0	0.00	0	0.00
TELEPHONE CRAFTSWORKER.	0	0.00	0	0.00
TOOL AND DIE MAKER.	0	0.00	0	0.00
TEACHER, ELEMENTARY SCHOOL	17	3.24	21	4.38
ZOOLOGIST.	1	0.19	2	0.42
TECHNICAL WRITER.	0	0.00	0	0.00
TYPIST.	0	0.00	0	0.00
URBAN PLANNER.	1	0.19	6	1.25
VETERINARIAN.	1	0.19	4	0.83
WASTEWATER TREATMENT OPERATOR.	1	0.19	0	0.00

Table 122 (continued)

X-RAY TECHNOLOGIST.	5	0.95	3	0.63
TEACHER, ART.	2	0.38	4	0.83
TEACHER, BIOLOGY.	2	0.38	2	0.42
TEACHER, BUSINESS.	3	0.57	4	0.83
TEACHER, ENGLISH/LANG. ARTS.	8	1.52	7	1.46
TEACHER, FOREIGN LANGUAGE.	3	0.57	2	0.42
TEACHER, HISTORY/SOCIAL STUDIES.	3	0.57	2	0.42
TEACHER, INDUS. ARTS/VOC.TECH.	2	0.38	1	0.21
TEACHER, MATHEMATICS.	1	0.19	3	0.63
TEACHER, PHYSICAL EDUCATION.	7	1.33	8	1.67
TEACHER, PHYSICAL SCIENCE.	1	0.19	1	0.21
WELDER.	0	0.00	0	0.00
AEROSPACE ENGINEER.	0	0.00	0	0.00
FIREFIGHTER.	1	0.19	1	0.21
KEYPUNCH OPERATOR.	1	0.19	1	0.21
LANDSCAPE ARCHITECT.	2	0.38	2	0.42
OPERATING ROOM TECHNICIAN.	1	0.19	0	0.00
OPTOMETRIST.	2	0.38	6	1.25
TEACHER, EARLY CHILDHOOD.	13	2.48	14	2.92
TEACHER, SPECIAL EDUCATION.	16	3.05	15	3.13
CONSTRUCTION INSPECTOR.	0	0.00	0	0.00
CORRECTION OFFICER.	4	0.76	1	0.21
GEOLOGIST.	2	0.38	1	0.21
HOSPITAL ADMINISTRATOR.	1	0.19	3	0.63
PHYSICIAN'S ASSISTANT.	0	0.00	1	0.21
STENOGRAPHER.	2	0.38	1	0.21
EEG TECHNOLOGIST.	0	0.00	0	0.00
NURSING ASSISTANT.	0	0.00	0	0.00
FLORIST (RETAIL & DESIGNER).	0	0.00	1	0.21
TEACHER, VOCATIONAL/TECHNICAL.	1	0.19	2	0.42
CHEF/COOK.	0	0.00	1	0.21
PLUMBER.	0	0.00	0	0.00
FOOD SCIENTIST/TECHNOLOGIST.	0	0.00	0	0.00
TELEVISION PRODUCER/DIRECTOR.	0	0.00	0	0.00
INTERPRETER/TRANSLATOR.	2	0.38	1	0.21
LEGAL ASSISTANT.	1	0.19	0	0.00
FARMER/FARM MANAGER.	0	0.00	1	0.21
256	0	0.00	0	0.00

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[a] "Pre" (first two columns) means first choice before the student received information about the rewards and risks associated with the occupation.

[b] "Post" (third and fourth columns) means first choice after receiving information about rewards and risks.

Table I23

Designation of First-Choice Occupations in Strategy with Respect to Desirability Sums and Estimated Chances for Entry

DESIRABILITY OUTCOME (N = 517)	FREQ	%
OCCUPATION WITH THE HIGHEST SUM.	189	36.56
WITHIN 10 POINTS OF THE HIGHEST.	107	20.70
MORE THAN 10 POINTS BELOW HIGHEST.	221	42.75
WHICH STRATEGY (N = 482)	**FREQ**	**%**
SUM HIGH;[a] CHANCES HIGH.	211	43.78
SUM HIGH;[a] CHANCES LOW.[b]	116	24.07
SUM LOW;[c] CHANCES HIGH.	97	20.12
SUM LOW;[c] CHANCES LOW.[b]	22	4.56
SUM HIGH; CHANCES EQUAL.	26	5.39
SUM LOW;[c] CHANCES EQUAL.	10	2.07

[a] *Sum High* means that the occupation had the highest Desirability Sum or came within 10 points of the highest sum.

[b] *Chances Low* means "chances not high"; i.e., the student estimated better chances for some other occupation in the set of three. *Low* does not necessarily mean *lowest*.

[c] *Sum Low* means that the Desirability Sum was not the highest or within 10 points of the highest. It does not mean that the Desirability Sum was necessarily the lowest of the three sums under consideration.

CHAPTER VI

FINDINGS AT PASADENA CITY COLLEGE

Description of College, Computer Configuration, and Career Counseling Services

Pasadena City College (PCC) in Pasadena, California, had an enrollment of approximately 13,000 day students, 9,000 credit evening students, and 9,000 noncredit students as of December 1975 when the SIGI evaluation team visited the college.

Computer Configuration

In December 1975, one SIGI terminal was in use at Pasadena. It was placed behind a glass partition in the career guidance center, a room that also housed the career reference library. Counseling offices were adjacent to the center.

SIGI was run on a PDP 11/40 based RSTS/E system which had 112K words of core memory and three RK05 1.2-million-byte cartridge disk drives. The computer was located in the main computer room on the fourth floor of a classroom building. The SIGI terminal, a Delta Data 5000, was connected to the computer by Bell 202 modems and DL11 single line interfaces. SIGI software was installed in March 1975.

A second Delta Data terminal was purchased in March 1976 and by December 1976 both terminals were installed on the first floor of the learning center building in a new career guidance center. Since the learning center is across the campus from the building where the computer is located, the terminals are connected to the computer by Bell 202 modems and DL11 single line interfaces.

One SIGI terminal is equipped with an Okidata 100-character-per-second matrix printer. The other terminal uses a Texas Instrument 30-character-per-second thermal printer.

The RSTS system is operated by the Director of Computer Services at PCC. It is used for other activities in addition to SIGI. Three teleprinters are used for instruction in BASIC language programming, physics, mathematics, chemistry, business, and statistics. Pasadena is also developing an interactive program for real estate market value determination.

How reliable is this hardware configuration? To find out, we asked the test sites to keep two logs from September 1 to December 1, 1976, one by the computer operators and the other by the SIGI monitors, describing each hardware problem and, if possible, identifying its source. The logs of the computer operators were sent to ETS every time there was a problem; the logs of the SIGI monitors were collected at the end of the test period.

During the time the logs were kept there were no problems beyond what might be expected in any computer system the size of SIGI. All the components are standard, off-the-shelf equipment requiring no modification for SIGI. Problems were taken care of by means of routine service procedures.

At the time of installation of the hardware, there were problems with the configuration of the modems which delayed the actual usage of the system by several weeks. Also, Pasadena had some initial problems with service on the Delta Data 5000 terminals and the Okidata printer. After these were taken care of, the reliability of the computer system hardware was good.

There were a few software problems at Pasadena. When the Prediction system was created, scales for a few variables were accidentally reversed.

On one occasion time-sharing operations were interrupted because the SIGI data collection procedure had not been followed and all the available disk space was in use. These problems occurred before the period in which logs were kept; they were resolved satisfactorily.

Career Counseling Services

Description of counseling department. Pasadena has 21 full-time counselors who handle academic, personal, and vocational counseling. At the time of the site visit, students were assigned to specific counselors according to their program of study. Since then, counselors have adopted a team approach. Four teams of counselors cover all the academic programs at PCC. Seven counselors, available to students who have not declared a major, are specifically equipped to handle career counseling.

At peak periods, part-time counselors are recruited from local high schools to assist with the registration of evening students. Pasadena also trains students as peer counselors to assist other students with registration forms, etc. Three paraprofessionals assist the counseling teams.

A workshop was held for counselors in February 1976. It was led by a member of the ETS Los Angeles office who had been briefed by the SIGI staff. He explained the theory behind SIGI, answered counselors' questions, and addressed their concerns.

Role of SIGI in counseling program. Pasadena has a new career guidance center, built in part from state construction funds, which opened in December 1976, a year after the ETS site visit. The career guidance center occupies the first floor of the learning center building. The two SIGI terminals, enclosed by large study carrels, are now located in a room by themselves where students enjoy maximum privacy with few distractions. A career resource library occupies the main part of the center with different offices close at hand: counseling, cooperative education and placement, registration, and financial aid. The library has a variety of resources and AV material.

Most counselors teach a course in educational and career planning. Although SIGI has not yet been incorporated into the course content for any of the sections, some counselors intend to integrate it in the future.

Pasadena's SIGI coordinator is a paraprofessional counselor who schedules student use of SIGI, publicizes the service, collects data for Pasadena's prediction and planning systems, and manages the career resource library. Plans are underway to hire an assistant.

At the time of the site visit, the coordinator was scheduling SIGI appointments for students on a first-come, first-served basis from 8:00 a.m. to 4:00 p.m., Monday through Friday. Approximately 25-30 students used SIGI each week. Demand for SIGI far exceeded available hours and many students had to schedule appointments a month in advance. The arrival of a second terminal has greatly improved the situation.

Initially most students at Pasadena learned about SIGI from a flyer which was posted around campus and distributed in the "Introduction to College" course, required for all freshmen under the age of 21. Other students were referred to SIGI by counselors, teachers, and friends. Students in one course, "Job Application Procedures," were required to use SIGI as a lab for the course.

Students were not screened before they used SIGI, but they were required to take a reading test or career tests as part of an independent evaluation study conducted by the college. The experimental students in the college's study had an hour session with one of three counselors to review their printouts after they had gone through the entire SIGI system. Other students generally did not have a post-SIGI interview, although some saw counselors on their own.

The data that follow were, of course, collected before the second terminal was added or the new career guidance center was opened. Access to SIGI for initiates was severely restricted because only one terminal was available.

Impact on Students

To measure the impact of SIGI on its users, we interviewed a few students who had gone through SIGI at each college, and we had questionnaires administered to a sample of SIGI users (experimentals) and a sample of students who were interested in using SIGI but had not started (controls). The colleges themselves selected the students to be interviewed and administered the questionnaires in accordance with our guidelines. (See Appendix D, letter to the college.) This section of this chapter discusses our findings from the interviews and questionnaires at Pasadena City College.

Interviews

The college counseling office randomly selected for our interviews a group of students who had used SIGI. We interviewed 13 of these subjects, seven men and six women. The experience of two of these people is especially useful in illustrating the impact of SIGI.

George. George came to SIGI with only a blurred image of what occupation he might enter. "My primary consideration is getting a job in something I like," was the best he could do to describe his occupational goal. He added, "And since I'm fairly flexible, it doesn't matter what." He had done well in high school English, and he had an interest in that subject as well as in math and science. He thought he might pursue a scientific occupation simply because he believed employment opportunities were better in that field than in any other. He recognized that he needed guidance. "The main reason I went to SIGI is because I didn't have a clear idea of what career I wanted," he said. "I had vague ideas, but nothing selected."

After weighting his values, George retrieved four occupations in Locate: Political Scientist, Optometrist, Civil Engineer, and Industrial Engineer. He then adopted a logical strategy for testing the validity of his value weights. He tested several occupations, mostly in the field of engineering, to see which value/specification had prevented their retrieval. If he found a test occupation to be so attractive that he was willing to change a specification in order to cause its retrieval, he would know that the value that had blocked it was not so important as he had originally believed. On the other hand, if he found himself willing to let the occupation go rather than change a specification, he would trust his original weights. None of the test occupations was appealing enough to make him distrust his value weights. With confidence that he was on the right track, he decided to confine the rest of his search to the four occupations that had already been retrieved.

He asked numerous questions about the four occupations in Compare, taking printouts of the information about personal qualifications. He wrote for additional information about civil engineering, using the reference cited in answer to one of the Compare questions. He also felt a need for information about local employment opportunities and local outlook, but he had found no way to get the information at the time of the interview. His exploration continued in Prediction and Planning. The feedback from those two systems confirmed, in his opinion, the suitability of the four occupations. In Strategy, Civil Engineer and Optometrist received the same Desirability Sums, with the result that those two occupations emerged as the top candidates.

What was George's state of mind when he finished SIGI? He was unwilling to commit himself to a single choice, but was definitely leaning toward engineering in general and civil engineering in particular. "I hadn't thought at all about Civil Engineer as a career," he said, "but now I'm thinking kind of seriously about it." The high Desirability Sum earned by Optometrist influenced him to keep an open mind about that occupation as well. He therefore decided to postpone declaring a major for as long as he could. But his inclination seemed to be toward engineering. Later in the interview he said:

> I kind of knew all along that I want to be an engineer, but it never came out. But then it kind of came to the surface. . . . I guess you could say that it [SIGI] was a main influence because it kind of pulled it [Civil Engineer] out from the buried depths of my mind."

Perhaps the main benefit of SIGI was in providing Geoge with a new way to look at his career options. He accepted the SIGI postulate that occupational values provide a basis for choice. He became aware of what his values were and he tested them in a systematic way. He also became aware that he himself had to play an active role in making a choice, and set about, in a limited way, to collect information and to make plans directed toward a goal. He developed a strategy that would leave his options open as long as possible. Information about local demand will play a large part in his final decision. Finally, he became aware that his judgments about the occupations he was considering had a rational foundation. They were not based on impulse, dreams, or uninformed advice. As George observed:

> Some people say, "Gee, I want to be a doctor; I want to be an engineer." They don't stop and think whether they'll be good enough for it or whether they'll like the profession once they're in it. It's possible I'll change from engineering, but I don't plan to select a major until after I transfer.

Marilyn. Marilyn was a young woman with difficult physical and emotional problems. She wore two hearing aids and had a slight speech impediment. Moreover, she was in conflict with her father, who thought that her ambition to become a secretary exceeded her abilities and that she should not be attending college at all. The combination of physical handicap and family conflict had sapped her self-confidence, and she was doubtful about any occupational goal. She said, "I know I wanted secretarial. But, see, I get a lot of pressure at home about what I want to do. My father doesn't think I'm doing the right thing, and that builds up and gets me mad, too."

SIGI helped Marilyn recover some self-confidence and focus her thoughts. She said of the Values system:

> I think it is a fantastic thing, especially for people who are confused like I am. This really helped me settle down now on what I want to do. But I was really confused when I first came in. . . . It is good for people who are so confused in their minds. They know what they're doing but they don't know how to start doing something about it or find information about doing it. The values helped me know what I really wanted in a job.

The Prediction system was especially useful to Marilyn. It boosted her self-esteem and gave her ammunition for the battle over her abilities. She said of it:

> I've always been knocked down--"Oh, you're not going to do this and do that." This was the first time I could sit here and think, "Well, how do I feel about it?" not what the other people feel. It [Prediction] gave me confidence about how you feel about what you're going to do, and that's what I don't have.

There was another tangible benefit from SIGI: Marilyn explored two additional occupations, Stenographer and Receptionist, and was considering them. But her first love was still Secretary. She returned to it on a higher plane of understanding with some assurance that it satisfied her values and lay within her reach--that it was a defensible choice. She said, "I'm looking forward to my future more than I ever have before."

Experimental and Control Group Questionnaires

Method of analysis. Separate questionnaires were given to students who had been through SIGI (experimentals) and to students who were scheduled to use SIGI but who had not actually used it (controls). This section of the report covers the responses of PCC students to the questionnaires. Since questions 1-41 are the same for experimentals and controls, we were able to run tests of significance comparing the responses of the two groups and to present the 41 questions, together with our findings, in a single table, P1. The portions of the questionnaires that are different are in separate tables: questions 42-45 for controls in Table P4 and questions 42-88 for experimentals in Table P5. (The intact questionnaires are in Appendix D.) In all cases the numbers in the tables are percentages unless otherwise indicated.

In the tests of significance, chi-squares were computed for most questions (1-24 and 37-41). In the computation, responses in logically related categories were grouped if the expected cell sizes fell below 5; this is a requirement for chi-square. For questions 25-29, in which students used scales to rate themselves on a variety of dimensions, _t_-tests were done on the computed group means. Questions 31-34 comprise an information test. Wrong answers for each question were scored 1 and correct answers 2. The four scores were then added and an information test score group mean was computed. It is shown opposite question 30 in Table P1. A _t_-test was then done on the two means. In reporting the results of all tests of significance, we follow the convention of using a single asterisk for significance at the .05 level and double asterisks for the .01 level.

Several of the questions are open-ended. Responses to these have been placed in separate tables. Tables P2 and P3 list the occupations named by experimental and control students in response to question 30 (What occupation would you like to prepare yourself for eventually?) The responses have been grouped according to whether or not the occupation named was among those already in SIGI. Other responses that could not be quantified appear in Tables P4A, P6, and P7.

Results. Questions 1-3 give a description of the sample in terms of age, sex, and college enrollment. The experimental and control groups do not differ significantly on these dimensions. In both groups, slightly more than half of the students were women, some 70% were between 15 and 22 years old, and approximately half were freshmen.

Questions 4-10 concern students' assessment of their career decision-making skills. Significant differences ($p < .01$) were found in five of the seven questions: The experimental group (SIGI users) indicated greater knowledge of the rewards and satisfactions to be obtained from an occupation (question 4), had explored more occupations (question 5), had more definite and specific career plans (questions 7 and 9), and indicated more overall confidence in their career decision-making skills (question 10). The groups were not significantly different in the number of occupations that students thought would provide desired satisfactions (question 6) and in their estimate of their ability to predict grades (question 8).

Insert Table P1 about here

SIGI also seemed to stimulate activities related to career exploration (questions 11-18). Significant differences ($p < .01$) were found in responses to four of the questions: More experimentals had used the college career reference library (question 14), talked to a guidance counselor about careers (question 16), used career-related audiovisual materials (question 17), and, not unexpectedly, had used "a computer-based guidance system" (question 18). No significant differences were found in the level of activity in reading about occupations (question 11), talking with friends about careers (question 12), talking with people in the field (question 13), or attending career planning workshops (question 15).

Given the opportunity to agree or disagree with certain statements about choosing an occupation, students who had used SIGI were significantly ($p < .01$) less disturbed by conflicting advice from others (question 21). No significant differences were found in the attitudes of the two groups toward following the advice of others, toward the role of chance in career choice, toward making their own decisions, toward the need to know marriage plans, or toward the need for making an immediate choice (questions 19, 20, 22, 23, and 24).

Questions 25 through 29 explored the way students rated themselves as career decision-makers. For four of these questions a significant difference was found between the responses of the two groups. SIGI users distributed themselves closer to the "good" end of the career decision-making scale than did nonusers (question 25) and showed more confidence in their knowledge of occupations (question 26) and of goals and values (question 29)--all $p < .01$. They were also more confident ($p < .05$) about their decisions, once made (question 28). No significant difference was found in how often students planned ahead (question 27).

As a check on these self-ratings, four questions were included to test the students' actual knowledge of occupations (questions 30-34). Students were asked to name a first-choice occupation (question 30) and were questioned about the education required, average salary, amount of independence, and employment outlook for that occupation. Tables P2 and P3 list the occupations named by the two groups of Pasadena students. They show that most of the occupations of interest to both groups are already offered by SIGI. First-choice occupations named by 60 of the 77 students in the experimental group and by 54 of the 76 students in the control group were SIGI occupations. A few students in both groups named identifiable occupations not in SIGI. The rest--11 students in the experimental group and 13 in the control--were unable to name a specific occupation or were undecided.

Insert Tables P2 and P3 about here

The replies to question 30 were sometimes difficult to tabulate because students often were unable to identify a specific occupation or to express clearly what they had in mind. We sometimes had to make judgments about a student's meaning. When the staff could not reach agreement, they recorded the answer as Too Vague to Classify. When the occupation named in question 30 was a SIGI occupation, we were in a position to evaluate the accuracy of the students' responses to questions 31-34 for both groups. These four questions constitute an information test, which was scored in the manner described earlier. The students who had used SIGI were found to be significantly better informed ($\underline{p} < .01$).

Responses to questions 37-41 show that the two groups were similar in their career guidance experiences (excluding SIGI) at Pasadena. Over two-thirds of both groups had seen a counselor within the last two months (question 37) about a variety of problems (question 38), but had not taken a career guidance course (question 39). Of those who had taken a career guidance course, the SIGI users were significantly ($\underline{p} < .05$) more satisfied (question 40). Generally, neither group had reservations about interacting with a computer for career guidance (question 41).

The remaining four questions in the questionnaire for the control group explored attitudes toward SIGI. They are listed in Table P4. Ninety-nine percent of the group had heard of SIGI (question 42) and wanted to use it (question 45). No one had formed an unfavorable impression of it (question 43). Members of the group had learned about it from a variety of sources (question 44).

Table P4A lists the responses of the control group to the open-ended questions.

Insert Tables P4 and P4A about here

The remaining 46 questions in the questionnaire for the experimental group sought to find out how these SIGI users rated their experience with SIGI (Table P5).

When asked to give SIGI a grade (questions 42-54), more than 75% of the students graded SIGI A or B for 8 of the 13 items (interest, clarity, overall usefulness, helping with values awareness, seeing relationships between values and career decisions, finding occupations to fit values, getting information, and learning to make career decisions). For the other five questions, which concern choice of an occupation, understanding predictions, estimating probabilities of success, and helping to plan a program of study at Pasadena, the proportion of A's and B's was over 50%.

Insert Table P5 about here

As for their experience with SIGI (question 55), 42% said that SIGI helped confirm a choice they had already made, 12% said that SIGI helped them to choose an occupation, and 39% thought that SIGI had suggested other occupations worth considering. Only 8% failed to perceive SIGI as having been directly helpful.

Questions 56-63 asked the experimental students whether they would consult SIGI, a counselor, or a combination of the two for help with occupational and educational decisions. The students would tend to choose the combination for most guidance purposes. This preference held true for planning a program of study, getting information about an occupation, confirming an occupational choice, resolving conflicts about occupational choice, and estimating chances of success in a program. SIGI alone was preferred for finding occupations that fit values and for making values more clear. A counselor alone was thought to be more help in finding out about financial aid.

Almost nine out of ten of the students who had used SIGI planned to schedule a conference with a counselor for a variety of purposes (questions 64 and 65). Two of the students added that they would go to a counselor to discuss the results of SIGI (see Table P6, question 65). Another stated, "I decided both seeing a counselor and using SIGI were valuable."

Most of the students (75%) said that the occupations in which they were interested were actually retrieved on the basis of their values in Locate (question 66). Although they named a few occupations as "missing" from SIGI (Table P6, question 67), the "occupations" they named were often not occupations at all, but general fields of interest; some were already in SIGI; some were specialties of occupations in SIGI; and some were occupations with only small numbers of workers. A few students mentioned occupations that are scheduled to be added to SIGI in the next round of additions (air traffic controller, anthropologist, chiropractor, travel agent). About 76% regarded the information in SIGI as superior to other sources of occupational information (question 68).

Insert Table P6 about here

Of the Pasadena students who had used SIGI, 85% were satisfied with the 28 questions made available in Compare (question 69). Although a few made suggestions for additions, many of these were either impractical ("In what position will I be happy?") or already in SIGI with different wording. The student who wanted "Financial aid information" would find it in the Planning system, not in Compare. The questions suggested for addition are recorded in Table P6.

About 88% of the students found SIGI's style and vocabulary to be "just right," and none said that it was too difficult (question 70). Since the reading level of the text was designed for community college students, this finding is particularly encouraging.

Few students detected any sexual or racial bias in SIGI (question 71). The examples given by those who did feel there was bias appear in Table P6.

Ninety-eight responses were made to question 72, asking about problems that might have occurred in using a computer-based system. Sixteen percent reported that the computer had broken down; 14% reported that the writing on the screen caused eyestrain; 13% said they felt rushed while using SIGI. Some of the directions were unclear to 9%, and 8% thought that there was too much reading. A variety of other irritations were mentioned by the 18% of the students who checked "Other," such as inability to go back to correct mistakes, or redundancies in the text (Table P6, question 72).

Almost three-fourths of the SIGI users frequently took advantage of the opportunity to get printouts, and only 1% used the printer just once or twice (question 73). Over two-thirds (67%) tried to get more information on their own initiative after using SIGI (questions 74 and 75). The majority (61%) of the students spent between two and four hours on SIGI, and 35% spent more (question 76). Nearly all those in the sample (97%) went all the way through SIGI, including Strategy, at least once, usually in two or more sessions (questions 77 and 78). More than half (58%) expressed an interest in securing additional time on SIGI (questions 79 and 80).

The six subsystems of SIGI seemed to meet a variety of different needs; every section would be "used most" by at least some students, although Planning and Values received the largest percentages of votes (26% and 21%, respectively). Prediction was the system named least often (question 81).

Students found SIGI to be comprehensive; 75% said that there was nothing more they would like it to cover (question 82). A few wrote in suggestions for improvement, such as relating occupations to college majors, adding more information about job search, and so on (Table P6, question 82). Nearly two-thirds (65%) said that there was no area that needed fuller coverage (question 83), but the others would have liked more material in Prediction, Values, and Locate; more information on courses at transfer colleges; and similar additions (Table P6, question 83). All areas except Prediction were liked best by some students; Values was the most popular, designated best by 38% of the group. The privacy that SIGI makes possible was considered very important to 18% of the group, but it made no difference to another 18% (question 85). Almost 80% of the group said that they had advised their college classmates to use SIGI; of these, about half (46%) had recommended it to three or more friends (questions 86 and 87).

Question 88 asked the students for suggestions for improving SIGI. The answers are listed in Table P7. Most of the suggestions were for expansion of the information or services offered by SIGI or for minor changes to enable students to move more quickly to the sections in which they were most interested. There were a few suggestions that revealed insufficient information on the part of the student. The general tone, however, was one of approval, respect, and gratitude.

Insert Table P7 about here

Impact on Counseling

Responses of eight Pasadena City College counselors who filled out questionnaires are tabulated in Table P8. (The constructed responses to the open-ended questions on that instrument are in Table P9.) Five of the eight had not attended the SIGI workshop. It is possible that some of the responses would have been different if all the counselors had been exposed to a workshop.

With or without a workshop, however, the counselors were in general favorably disposed toward the idea of computer-based guidance (questions 4-8). Only one saw computer-based guidance as a passing fad (question 4), and only one did not plan to use such a system in his or her counseling (question 7). None thought computer-based guidance was a threat (question 6) and all eight had actually referred students to SIGI (question 12). Counselors who had used SIGI and had observed SIGI students thought that those students reacted favorably to SIGI (question 13) and benefited in a number of ways (question 28). They thought that the reading level of SIGI was appropriate for their students (question 32), that the occupational information was better than what is generally available (question 33), and that SIGI was for the most part free from any kind of bias (question 34). Six counselors reported that students came to them with printouts (question 14). Interpretation of the students' printouts was not a large problem: The problems described (Table P9) do not really involve interpretation of printouts. Only three counselors said that students had encountered problems with the terminals (question 15): Students "found it difficult to relate to the definitions of the values" (a problem that does not seem to be associated with the terminals), and there were apparently some hardware malfunctions that were corrected (Table P9).

Questions 16-23 were designed to explore the effect SIGI might have on problems that counselors face in career guidance. The chief problems were keeping up to date with occupational information, finding time to see all students who needed help, and getting students to read occupational information; the most frequently specified minor problems were identifying sources of occupational information, identifying students who need help, and getting students to read occupational information. Five of the six problems listed were designated by at least one of the counselors as having felt the impact of SIGI. SIGI was seen to have had the most effect on getting students to read occupational information and on keeping counselors up to date, and some effect on all the problems except selecting programs appropriate for students' career goals.

Insert Table P8 about here

All eight counselors responded to questions 24-27, which explore the impact that SIGI may have exerted on counseling sessions. Of counselors who had had opportunity to observe, only one thought that SIGI enabled him or her to see more students, whereas five noticed no change; three thought that SIGI had improved the quality of their discussions about values and career decisions, and only two saw no change in quality. Three counselors saw no change in the amount of time they spent in career counseling, while four thought their time had increased and none thought it had decreased. Four counselors thought their counseling sessions were longer because of SIGI, none thought they were shorter, and three noticed no change.

Question 28 sought to discover how SIGI had affected students' career decision-making behaviors that might be observed in counseling sessions. Six counselors said they knew which students had used SIGI, but only four (perhaps not always the same four) specified the differences in behavior they had observed. In the opinion of the counselors, the SIGI students rated higher than non-SIGI students in four categories of behavior: their ability to relate programs of study to occupations under consideration (4 yes, 0 no), their ability to state their primary occupational choice (3 yes, 1 no), their ability to mention possible alternative occupations (3 yes, 1 no), and their ability to demonstrate sound reasons for their preferences (3 yes, 1 no). Two counselors thought the SIGI students were better able to express their occupational goals, were better informed about their first-choice occupation, and were better able to predict their chances of success; two counselors did not think the SIGI students were any different with respect to these categories.

Question 29 explored the subject of how SIGI should be fitted into the structure of the counseling department. Three counselors accepted the idea of making SIGI available to students on an entirely ad lib basis with no counselor intervention or mandatory follow-up. Nine responses favored a structure in which the counselor would play a direct role in the career guidance process. Counselor referral to SIGI with mandatory follow-up and use of SIGI as part of a formal classroom unit in career counseling were the structures named most frequently--four times each. One counselor suggested that SIGI be made available "for student self-referral" (Table P9), a configuration that seems to be the same as the ad lib option.

Counselors named some seven occupations or occupational areas that they or their students would have liked to see in SIGI (questions 30 and 31). (Some of these were already in SIGI under different names.) Three counselors suggested improvements for SIGI (question 35), and two added comments under "Optional Information." Their observations and the suggested occupations are listed in Table P9.

Insert Table P9 about here

Usage of the System

The computer automatically records the responses that students make to most displays. Tables P10-P23 represent these summary data on students who used SIGI at Pasadena City College. The n's vary from table to table, with higher frequencies in Values, Locate, and Compare, which novices encounter first, and lower frequencies in Prediction and Strategy, which novices encounter last. The reasons for the decrease cannot be isolated. In any case, the reader should bear in mind that the summary data do not indicate the progress through SIGI of a particular group of students. They are merely a record of responses over a period of time. Some of the students were already in Planning or Strategy when the data collection began, and others were just beginning when the disk was swept clean of the accumulated data. Thus the tables are to some extent independent of one another. Nevertheless, the n's are sufficiently large to reflect the way SIGI was used.

Data from the SIGI Introductory Sequence

Breakdown of the sample. Table P10 shows the breakdown of this sample by age, sex, and enrollment status. Percentages are given rather than actual numbers because students are asked about their age and enrollment status every time they sign on, since these variables may have changed between sessions.

We see that nearly half (42.6%) of "sign ons" were eighteen or under--that is, they were students who had presumably gone directly to college from high school; consequently, there were proportionately fewer "older students." The sample was about evenly divided between men and women.

Insert Table P10 about here

Initial status with respect to career decisions. On their first pass through the introductory sequence, students respond to questions about their awareness of their occupational values, about their identification of occupations that fit their values, about their ability to predict their grades, and about their knowledge of appropriate programs to enroll in. Table P11 gives the distribution of their responses to these questions. The table reflects the state of mind of students as they begin their interaction with SIGI. We may make the following observations:

Insert Table P11 about here

1. Nearly a quarter of the students in the sample said they knew their values, and over half of them had a general idea of what they want from an occupation but had not analyzed their values ("Value Status").

2. They tended to feel a need for much information about which occupations fit their values.

3. They believed that they could predict their grades successfully in at least some programs.

4. Most of them had little or no idea what program to enroll in and would like help in planning.

Data from the Values System

The Values system yields measures showing the importance that students attach to each of the ten occupational values used in SIGI and also indicates the field of interest they would like to work in.

Values weights. Table P12 shows the means and standard deviations of the weights that students assigned to the values on a scale where 0 designates no importance and 8 maximum importance. The figures in the

"Unrestricted" column are the weights assigned by students before they played the Values Game--i.e., the numbers represent the students' initial reactions to the definitions of the values. The "Restricted" column reflects the effects of both the Values Game and the constraint that the sum of the weights equal 40. The latter condition, of course, largely accounts for the smaller means in the Restricted column. It is not possible to separate the effects of the Values Game and the restriction to 40 points on all changes from the Unrestricted to the Restricted columns. In general, however, it would not be unreasonable to attribute changes in rank order (Income, Security, Variety, Helping Others, Prestige, and Leisure) primarily to the Values Game.

Insert Table P12 about here

Table P12 shows (a) that each of the values was important to some students; (b) that there was no serious ceiling or floor effect, since even the highest and lowest weighted values exhibited sizable variation; (c) that, in general, Interest Field, Income, Independence, and Security were the four most important values for this group, whereas Early Entry was the least important; and (d) that in reaching the 40-point limit, students selectively reduced the weights originally assigned--that is, not all weights were decreased proportionately. Students were least willing to give up Interest Field and Income and were most willing to reduce weights for Early Entry and Prestige.

The low weight given to Early Entry is not surprising, since all the students had already made some commitment to education beyond high school.

It is also interesting to note that the standard deviations show very little reduction. Indeed, one case (Helping Others) shows a slight increase. Thus, the restricted case does not appreciably reduce the variance of the weights.

Selection of interest field. Before weighting the value Interest Field, students indicate which one of the six fields interests them most. They are given the opportunity to change fields before they adjust their weights to sum to 40 and whenever they elect to return to the Values system to review the weights originally assigned.

Table P13 shows the number of times each field was selected. Note that "N=1011" in this table means that 1011 interest field selections were made by the sample of students. Some may have chosen the same field more than once, and others may have changed fields.

Insert Table P13 about here

Table P13 shows that the Personal Contact interest field was clearly the most popular, with Verbal in second place. The Technological and Aesthetic fields were least popular.

Data from the Locate System

In Locate, students select a set of five values as a screen for retrieving potentially attractive occupations. The students specify a minimum return they would like on each value, and the computer then lists occupations that meet or exceed that minimum for each of the five values. Although students may choose any five of the ten SIGI values, the students are encouraged to choose their top-weighted ones.

Values selected for the screen. Table P14 shows the frequency with which each of the 10 values was selected as a member of the retrieval set. It may be inferred that students tend to use their most cherished values in Locate, for there is close agreement between the rank order of the value weights (Table P12) and the rank order of the frequencies in Table P14.

Insert Table P14 about here

Specification levels or categories. For each value except High Income and Interest Field the student may specify one of four possible levels; there are five levels for Income, and there are six categories (not levels) for Interest Field. Table P15 shows the frequency with which the various levels or categories were specified. Again, the *n*'s and the numbers listed in the "FREQ" column indicate the number of times a value or specification was used, not the number of students making the specifications. Also, the numbers are associated only with values/specifications that actually retrieved acceptable lists of occupations. If a student's specifications are too strict or too loose, resulting in empty lists or ones of unwieldy size, he must alter the specifications, one at a time but in any order, until he finally arrives at a set that does retrieve.

Table P15 indicates that all the degrees of specification are used. The fact that the retrieval of an empty list forces the student to lower a specification (or change interest fields) may account for the frequency with which the lowest specification appears. (A value set at the lowest

Insert Table P15 about here

level does not screen, since all occupations meet or exceed that specification.) Table P15 also shows that students tend to specify mostly average and above average levels, and that when they use Interest Field as one of their search values, the most popular field (Personal Contact) was the one most frequently chosen in the Values system.

Occupations retrieved in Locate. What occupations do these values/specifications retrieve? Table P16 lists all the occupations in SIGI at the time of the data collection and the frequency with which each was retrieved. The frequencies include the interaction of initiates (students who have gone through the six subsystems in the prescribed order and who are consequently privileged to return to any subsystem) as well as novices.

In all, 147 occupations of the 155 in SIGI were retrieved for a total of 12,642 times. As would be expected from the relative popularity of various levels of specification, professional occupations were much more frequently retrieved than were nonprofessional occupations. The eight occupations that were not retrieved are

Insert Table P16 about here

- Keypunch Operator
- Medical Laboratory Technician
- Nursing Assistant
- Operating Room Technician
- Science Laboratory Technician
- Telephone Craftsworker
- Wastewater Treatment Operator
- Welder

No occupation appeared more frequently than about 3.6% of the total frequency, for novices and initiates. If we pool the various teaching occupations, the most frequently retrieved occupations (i.e., more than 200 retrievals) would be

- Teacher
- Pilot
- Lawyer
- Psychologist
- Physician
- School Counselor
- Rehabilitation Counselor
- Dentist
- Speech Pathologist/Audiologist
- Civil Engineer
- Industrial Engineer
- Optometrist
- Urban Planner

Data from the Compare System

Occupations selected for examination. Table P17 shows the frequency with which students (initiates and novices) selected occupations for examination in the Compare system. Students may select any occupations they want, but they are particularly encouraged to investigate occupations retrieved in Locate because those occupations tend to satisfy their values.

There were only three occupations (EEG Technologist, Nursing Assistant, and Chef/Cook) that students never selected. Students did not confine themselves only to occupations retrieved in Locate. For example, seven of the eight occupations that were never retrieved in Locate were asked about in Compare; only Nursing Assistant had a frequency of zero in both systems. On the other hand, the secondary school teaching occupations, which were frequently retrieved in Locate,were asked about in Compare with relatively low frequency. Only Special Education Teacher, Physical Education Teacher, and Elementary School Teacher were asked about more than 1% of the time. It seems possible that many students tended to avoid the teaching occupations because they knew the job market has turned sour. In general, however, the two sets of frequencies appear to be quite consistent. The occupation most frequently asked about (3.5% of the total frequency) was Lawyer. Of the 13 most frequently retrieved in Locate, only Pilot, Dentist, and Optometrist are not among the "over 1%" list for Compare. In comparing absolute frequencies of occupations retrieved in Locate with those used in Compare, one must allow for the fact that a given occupation may be retrieved several times by one student through various lists of specifications in Locate, but will probably be selected only once by that student for examination in Compare.

Insert Table P17 about here

Questions for which answers were sought. Students may ask up to 28 questions about the occupations they have selected. (For a list of the questions, see Figure 2, Chapter II.) Table P18 shows the frequency with which each of the questions was asked. All the questions were asked

Insert Table P18 about here

with considerable frequency, the highest being 7.5% of the total. The least favored were "Opportunities for leadership?" and "Prestige level?" The five most often chosen were, in order,

Description of work activities?
Definition of occupation?
Education required--Early Entry?
Beginning salary?
Employment outlook?

Data from the Prediction System

Reports of previous academic performance. Table P19 summarizes students' responses to questions about their previous academic performance. The responses are stored by the computer and may (or may not) be included among the predictor variables in any of the regression equations that compute the probability of a student's receiving various grades in a particular "key course." Table P19 shows that nearly 70% of the Pasadena City College students reported that they had ranked in the second or third fifth of their high school class, and over 70% said that their mathematics grades had been mostly B's and C's. They presented a somewhat rosier pic-

Insert Table P19 about here

ture with respect to their English grades; more than a quarter of the students reported that they had earned A's, and more than 70% of them said they had got B or better. On the other hand, fewer than half of them were confident that they needed no help with English, and about one-third of them believed positively that they did need help. Apparently some students did not think that a grade of B or better in high school English guaranteed sufficient mastery for college work.

Programs for which predictions were requested. The list of programs for which the student can obtain predictions is different at each college. At the time of the evaluation, predictions were available in 68 programs at Pasadena City College. Table P20 lists these programs and shows the frequency with which each was selected in the Prediction system. Students sought predictions in all the programs except Chiropractic. The programs most frequently selected were Business Administration, Law, Psychology, Accounting, and English.

Insert Table P20 about here

Selection of questions about probability. Also available in the Prediction system are explanations of probability and prediction. The explanations are in the form of answers to five questions that the student (novice or initiate) may ask if he chooses. (See Figure 5, Chapter II for the wording of the questions.) The questions were included in SIGI because we knew from our past experience that the concept of probability is difficult for many students. The frequency with which each question was selected appears in Table P21. The questions were selected with about equal frequencies. Assuming one question per student, 109 students sought answers to one or another question. This is about four-fifths (83%) of the students using the Prediction system, if we assume that the number of students is the same as or close to the number that reported their previous academic performance in Table P19--in the case of Pasadena, 132.

Insert Table P21 about here

Data from the Strategy System

(No summary data are collected from the Planning system. Indeed, the only information from that system that is worth recording as summary data would be the names and frequencies of the occupations selected for planning.)

In Strategy, the student selects a set of three occupations and indicates which one he favors most. Then he sees the Desirability Sums of the occupations. (See Chapter II, pages 32-34 for a description of Desirability Sums.) Next, he interacts with a discussion of a decision-making strategy based on assessment of rewards and risks, after which he estimates the probabilities of his successfully completing all the requirements for entry into each of the occupations. Finally, he once again indicates which of the occupations he favors most in light of the information he has accumulated about rewards (Desirability Sums) and risks (probability of entry).

Table P22 shows, in the first two columns, the frequency with which occupations were designated first choice when the set of three occupations was selected, and, in the third and fourth columns, the frequency with which they were designated first choice after assessment of rewards and risks.

Insert Table P22 about here

We must be cautious in interpreting Table P22, since it shows frequencies of choice, not changes. We cannot infer, for instance, that no students changed their minds about an occupation that has the same "post" frequency as "pre" frequency. We may note, however, that the most popular occupations, in terms of post frequency, were Psychologist, Lawyer, School Counselor, and Rehabilitation Counselor. Also, if we list occupations with a difference of 3 or more (in either direction) between the pre and post frequencies, we see that Rehabilitation Counselor, Speech Pathologist/Audiologist, Automobile Mechanic, Civil Engineer, and Dentist made gains (5, 5, 3, 3, and 3 respectively), whereas Psychologist (-12); Accountant, Interior Designer/Decorator, Registered Nurse (-5); Elementary School Teacher, Flight Attendant (-4); and Architect, Commercial Artist, Electrical Engineer, Early Childhood Teacher (-3) had losses.

Choice in relation to desirability outcomes. What influences students' choice of occupation in this context? Table P23 provides some insights. Under the heading "Desirability Outcome" are the frequencies with which students, in their pre choice, selected the occupation that later turned out to have the highest Desirability Sum, to come within 10 points of the highest sum[1], or to fall more than 10 points below the highest. Apparently, more than one-third (39%) of the time students did not designate as their first choice the occupation that, as they soon learned, was the most likely to satisfy their values.

Insert Table P23 about here

The next set of figures, under the heading "Which Strategy," assesses the post choice of occupation with respect to the measures of reward and risk. The reader should understand that the options listed in the table do not all exist at the same time. For example, if the student had estimated that his chances were equal for successfully entering each of the three occupations, he would have only the last two options on the list: He could choose either the occupation with the greatest Desirability Sum or one with a smaller sum. If he had made differential estimates of success, some of the first four options would be present, but not the last two; moreover, it might be that none of the three occupations had the fortunate combination of greatest Desirability Sum and greatest chances, and therefore the student would not have the first option. The reader should also remember that Sum high means having the highest Desirability Sum or coming within 10 points of the highest.

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[1] Students are told to ignore differences of 10 points or less between Desirability Sums. For a discussion of how the 10-point "error" term was estimated, see Counselor's Handbook for SIGI (which is Appendix G of this report), pp. IX-12--IX-14.

Nevertheless, we can make some inferences. The first four categories under "Which Strategy" represent instances of differences in both sums and chances. If we make the reasonable assumption that students would nearly always choose "Sum high, chances high" when that option was present, we have left 233 instances (123+81+29) where students had to choose on the basis of highest sum, best chances, or some combination in which neither factor was best. In 123 instances (53% of the time), they selected the occupation with the highest sum; in 81 instances (35% of the time), they selected the occupation with the best chances; and in 29 instances (12% of the time), they selected an occupation that had neither the highest sum nor greatest chances. (This last is not necessarily an illogical choice, since it may be the best combination of reward and risk. See Counselor's Handbook for SIGI, which is Appendix G of this report, pages IX-25--IX-26.) There were 45 occasions when students estimated their chances as equal for all three occupations. In this situation, they made the apparently logical choice (occupation with the highest sum) 32 times and the apparently illogical one 13 times. We must be careful, however, not to infer that those 13 choices came from students who did not know what they were doing. We have learned from our interviews that behavior which appears inexplicable in printouts often has some logical explanation--even if it is only that the student was late for class and pushed the last few buttons at random to reach "sign off" as quickly as possible.

Table P1: Responses by Experimentals and Controls to Questions 1-41 of SIGI Evaluation Questionnaires

(Unless otherwise noted, all figures except n's are percent.)

PERSONAL INFORMATION

1. Age: $n_E = 77$ $n_C = 75$

C	E	
71	70	(1) 15-22
20	19	(2) 23-30
9	10	(3) Over 30
0	0	(4) Rather not say

2. Sex: $n_E = 77$ $n_C = 76$

C	E	
42	36	(1) Male
58	64	(2) Female

3. Year in college: $n_E = 75$ $n_C = 75$

C	E	
46	52	(1) 1st
36	32	(2) 2nd
11	11	(3) 3rd
4	3	(4) 4th
3	3	(5) Graduate student

CAREER DECISION-MAKING

**4. How well do you know what rewards and satisfactions you want from an occupation? $n_E = 77$ $n_C = 76$

C	E	
13	34	(1) I know exactly what I want from an occupation.
67	58	(2) I have a general idea of what I want from an occupation.
16	6	(3) I'm not sure what I want from an occupation.
4	1	(4) I have no idea what I want from an occupation.

**5. How many occupations have you explored as possibilities for yourself? $n_E = 77$ $n_C = 76$

C	E	
5	1	(1) None
49	27	(2) 1-2
30	43	(3) 3-4
16	29	(4) More than four

6. How many of the occupations that you know about are likely to give you the satisfactions you want? $n_E = 77$ $n_C = 73$

C	E	
10	6	(1) None
74	66	(2) 1-2
11	22	(3) 3-4
5	5	(4) More than 4

**7. Which of the statements below best describes how definite your career plans are? $n_E = 76$ $n_C = 76$

C	E	
17	41	(1) I know exactly the occupation I want to enter.
22	32	(2) I am trying to decide between two different occupations.
37	17	(3) I am considering three or more different occupations.
24	10	(4) I do not have any specific occupation in mind at this time.

8. How well do you think you can predict your grades in various programs at your college? $n_E = 77$ $n_C = 76$

C	E	
42	44	(1) I think I could predict my grades accurately in any program of study I might take.
37	45	(2) I think I could predict my grades accurately in one or two programs, but not in all
13	10	(3) I have only a general idea of my grades in one or two programs.
8	0	(4) I can't predict my grades well in any program.

**9. Which of the following best describes the present state of your plans? $n_E = 77$ $n_C = 76$

C	E	
18	58	(1) I know which program to enroll in, which courses to take, and most of the other steps necessary to reach my occupational goal.
53	30	(2) I have a general idea of which program would be best, but I am not sure what other steps are necessary to reach my occupational goal.
29	12	(3) I don't know which program to take. I need help in planning my education.

Table P1 (continued)

C		E	
	**10.		Overall, how confident do you feel about your career decision-making skills?
12		49	(1) Very confident $n_E = 76$
56		45	(2) Somewhat confident
32		6	(3) Not confident $n_C = 76$

Items 11-18 are activities related to thinking about occupations. Put a check under the heading which shows how much time you have spent on each of the activities.

	Never	Rarely	Sometimes	Often
11. Reading about occupations. $n_E = 76$ ($n_C = 76$)	3 (4)	22 (36)	53 (47)	22 (13)
12. Talking with friends about the kinds of occupations they are considering. $n_E = 76$ ($n_C = 76$)	0 (3)	9 (14)	39 (37)	51 (46)
13. Talking with people in the field about their occupations, $n_E = 75$ ($n_C = 75$)	5 (19)	29 (23)	47 (45)	19 (13)
**14. Using the college's career reference library. $n_E = 76$ ($n_C = 75$)	31 (54)	33 (27)	25 (16)	12 (3)
15. Attending career planning workshops. $n_E = 75$ ($n_C = 76$)	69 (75)	24 (19)	5 (5)	1 (1)
**16. Talking to a guidance counselor about careers. $n_E = 76$ ($n_C = 76$)	8 (33)	39 (41)	38 (18)	14 (8)
**17. Using career-related audiovisual materials. $n_E = 76$ ($n_C = 76$)	49 (71)	30 (25)	13 (4)	8 (0)
**18. Using a computer-based guidance system. $n_E = 75$ ($n_C = 76$)	11 (93)	39 (7)	40 (0)	11 (0)

For statements 19-24, put a check under the heading that best describes how you feel.

	Strongly Disagree	Disagree	Agree	Strongly Agree
19. I would follow the advice of a teacher, counselor, parent, or friend in planning my career. $n_E = 76$ ($n_C = 75$)	9 (8)	33 (27)	55 (58)	3 (7)
20. Which occupation I enter will be mostly a matter of chance. $n_E = 76$ ($n_C = 75$)	47 (40)	42 (47)	9 (13)	1 (0)
**21. Everyone seems to tell me something different, so I don't know which career to choose. $n_E = 76$ ($n_C = 76$)	30 (19)	55 (42)	12 (34)	3 (5)
22. I will decide for myself which occupation to choose. $n_E = 76$ ($n_C = 76$)	0 (0)	1 (7)	37 (45)	62 (48)
23. In order to plan for a career, I would need to know how soon I would be getting married. $n_E = 75$ ($n_C = 74$)	48 (48)	36 (38)	13 (11)	3 (3)
24. There is plenty of time before I have to start thinking about choosing an occupation. $n_E = 77$ ($n_C = 76$)	51 (50)	36 (41)	9 (8)	3 (1)

Table P1 (continued)

		$\overline{X}$	S.D.
**25. Rate yourself on how good a career decision-maker you think you are.	$n_E = 73$	6.89	2.20
	$n_C = 73$	5.72	2.14

Look at the scale below. Think of a friend your age who, in your opinion, makes good career decisions. Consider that person at the top of the scale (10).

Think of a friend your age who is not a good career decision-maker. Consider that person at the bottom of the scale (0).

Now think about yourself as a career decision-maker. Where do you fit on this scale? Circle the appropriate number on the scale from 0 to 10.

	0	1	2	3	4	5	6	7	8	9	10
E	0	1	1	7	10	4	14	15	23	15	10
C	0	0	3	17	16	12	12	14	18	4	4
	poor career decision-maker										good career decision-maker

For items 26- 29 mark an X on the part of the scale which best shows what is true of you.

		$\overline{X}$	S.D.
**26. How much do you know about occupations?	$n_E = 67$	2.61	.87
	$n_C = 75$	1.95	.86

	0		1		2		3		4
E	0	0	10	6	19	9	37	6	12
C	3	5	17	7	36	11	18	0	3
	very little								a great deal

		$\overline{X}$	S.D.
27. How often do you plan ahead?	$n_E = 75$	3.05	1.00
	$n_C = 75$	2.95	1.06

	0		1		2		3		4
E	1	0	5	3	19	0	24	11	37
C	0	0	11	5	15	4	22	3	40
	rarely								often

		$\overline{X}$	S.D.
*28. How do you feel after making an important decision?	$n_E = 76$	2.81	.80
	$n_C = 74$	2.50	.96

	0		1		2		3		4
E	0	1	5	0	22	1	47	4	13
C	5	1	4	0	29	10	38	4	9
	I usually don't think I've done the right thing.								I am sure I did the right thing.

		$\overline{X}$	S.D.
**29. How clear is your knowledge of goals and values?	$n_E = 76$	3.07	.93
	$n_C = 75$	2.61	1.01

	0		1		2		3		4
E	0	1	3	0	12	0	41	12	29
C	4	0	8	3	22	7	33	7	16
	not clear								very clear

OCCUPATIONAL INFORMATION

**30. What occupation would you most like to prepare yourself for eventually? Even if you are undecided, pick an occupation that appeals to you.

Name of occupation: Items 31+32+33+34, Information Test

	$\overline{X}$	S.D.
$n_E = 60$	6.65	.95
$n_C = 54$	5.80	1.09

Table P1 (continued)

% RIGHT | % WR

Answer questions 31-34 in relation to the occupation named in Item 30.

E 87 | 13 31. To enter this occupation, how much education beyond high school would you need?
C 70 | 30

___ (1) None.
___ (2) 2 years.
___ (3) 4 years (bachelor's degree).
___ (4) 5-6 years (master's degree).
___ (5) 7 or more (doctorate or law degree).
___ (6) Other (please explain: ______________________________)
___ (7) I don't know.

E 52 | 48 32. Check the salary range that indicates the average amount of money per year earned by people in this occupation.
C 26 | 74

___ (1) $20,000 or more
___ (2) $15,000-$19,999
___ (3) $11,000-$14,999
___ (4) $8,000-$10,999
___ (5) $7,999 or less
___ (6) I don't know.

E 57 | 43 33. Check the one statement which best describes the amount of supervision usually received by workers in this occupation.
C 30 | 70

___ (1) Work without supervision; plan own work; seldom evaluated by others.
___ (2) Supervised weekly; follow overall assignments.
___ (3) Supervised daily; work under supervisor who assigns and schedules work; free to decide details of work.
___ (4) Supervised hourly; activities are directly supervised with little opportunity to act on your own.
___ (5) I don't know.

E 70 | 30 34. Check the one statement which best describes the future employment prospects for workers in this occupation.
C 61 | 29

___ (1) Excellent: Strong demand for workers; shortage of qualified people.
___ (2) Good: Steady demand for workers.
___ (3) Fair: Demand limited except in certain geographic areas OR demand is decreasing due to automation or economic conditions.
___ (4) Poor: Little demand, if any; the occupation is very overcrowded, and few jobs are available.
___ (5) I don't know.

35. What college program (major) are you presently enrolled in? ____________

36. What occupation are you preparing for in this program or major? ____________

CAREER GUIDANCE

37. Have you seen a counselor during the last two months? $n_E = 75$ $n_C = 76$ 79 / 66 (1) Yes 21 / 34 (2) No

C	E	38. If yes, what thing(s) did you discuss? $n_E = 239$ $n_C = 136$
5	9	(1) Your values
13	18	(2) Occupational choice
13	13	(3) Occupational information
19	14	(4) Curriculum choice
21	16	(5) Course selection
5	9	(6) Chances for success
11	6	(7) Program approval
3	5	(8) Family pressures
4	8	(9) Financial aid
6	2	(10) Other (please explain: ______________________________)

Table P1 (continued)

39. Have you taken or are you presently enrolled in a career guidance course at your college?
$n_E = 76$ 33 (1) Yes 67 (2) No
$n_C = 76$ 22 78

C E

*40. If yes, how would you rate it?

13 48 (1) Excellent $n_E = 25$
56 44 (2) Adequate
31 8 (3) Poor $n_C = 16$

41. How do you feel about interacting with a computer for career guidance?

79 75 (1) Favorable $n_E = 77$
21 23 (2) Neutral
0 1 (3) Unfavorable $n_C = 75$

$^{*}p < .05$

$^{**}p < .01$

Table P2

Occupations Named by Experimentals in Response to Question #30

In SIGI[a]	Not in SIGI	Too Vague to Classify
(60 occupations)	(6 occupations)	(11 responses)
Accountant	Business Management	B.S. or M.S. Degree in Math
Actor/Actress (2)[b]	Chiropractor	Behind the scenes in T.V. Stage
Architect	Christian Singer and/or Missionary Work	Bio stat
Chemist	Entomologist	Business field
Civil Engineer	Environmental Conservation	Community service
Commercial Artist	Foreign Consul	Criminology
Dentist		French, Science, Music
Electrical Engineer (3)		Journalism
Engineering Technician		President of a company
Flight Attendant		Researcher
Forester (2)		(Don't know)
Interpreter/Translator (2)		
Landscape Architect		
Landscaper		
Lawyer (8)		
Legal Assistant (3)		
Nurse, Registered (3)		
Occupational Therapist		
Photographer		
Physician's Assistant		
Physicist		
Pilot (2)		
Police Officer (2)		
Psychologist (2)		
Radio Announcer		
Real Estate Agent		
Retail Store Manager		
Secretary (2)		
Singer		
School Counselor (3)		
Teacher, Elementary (4)		
Television Producer/Director (2)		
Typist		
Veterinarian		

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[a] If the occupational title used by the student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Stewardess" is listed as "Flight Attendant," "Airline Pilot" as "Pilot," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table P3

Occupations Named by Controls in Response to Question #30

In SIGI[a]

(54 occupations)

Accountant (3)[b]
Architect
Auto Mechanic
Bank Officer
Chemist
Dental Assistant
Dentist
Electrical Engineer (2)
Firefighter
Flight Attendant
Industrial Engineer
Landscape Architect
Lawyer (4)
Legal Assistant (3)
Mathematician
Musician (2)
Nurse, Practical
Nurse, Registered (4)
Nurseryman/Landscaper
Occupational Therapist
Pharmacist
Physical Therapist (2)
Pilot
Psychologist (5)
Public Relations Worker
Recreation Worker (2)
Secretary (2)
Teacher, Art
Teacher, Early Childhood
Teacher, Elementary
Teacher, Physical Education
Teacher, Special Education (2)
Television Producer/Director
X-ray Technologist

Not in SIGI

(9 occupations)

Business Administration
Carpet Layer
Chiropractor (2)
Fish Culturist
Gem Faceter
Personnel Management
Probation Officer
Sociologist, recreation-related

Too Vague to Classify

(13 responses)

Data processing, computer science
Entertainment field (broadcasting ?)
Health & nutrition or public relations
International relations
Journalism
Medical field
Physiology Instructor
Research into Parapsychology
Sales--advertising
Teaching, human physiology
Television studio work
Undecided but French, music major
Work in fine or commercial art

---

[a] If the occupational title used by the student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Stewardess" is listed as "Flight Attendant," "Airline Pilot" as "Pilot." etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table P4

Responses to Questions 42-45 of SIGI Evaluation Questionnaire for Controls

(Unless otherwise noted, all figures except n's are percent.)

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42. Are you aware that there is a computerized guidance system (SIGI) on campus? n = 76
99 (1) Yes 1 (2) No

43. If yes, what is your impression of SIGI? n = 75
72 (1) Favorable
21 (2) Neither favorable nor unfavorable
0 (3) Unfavorable
7 (4) No impression

44. How did you learn about SIGI? n = 96
28 (1) Friends
31 (2) Counselor
19 (3) Posters, Brochures
7 (4) Newspaper
15 (5) Other (please explain: ____________________)

45. Do you want to use SIGI? n = 75
99 (1) Yes 1 (2) No

If yes, when? ____________________

If no, why not? ____________________

PLEASE RETURN THIS QUESTIONNAIRE TO ETS IN THE ENVELOPE PROVIDED.

THANK YOU FOR YOUR COOPERATION.

Table P4A

Control Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #38 (Other Reasons for Seeing a Counselor)

How good I would be at accounting.
I just signed up for classes.
SIGI.
Help in studying (homework).
Personal.
This testing program.
Transferring (to UCLA). (Mentioned by 2 students.)
Graduation.
How hobbies will fit in with occupation.

Question #44 (Other Ways of Learning About SIGI)

Psychology teacher.
Teacher. (Mentioned by 3 students.)
Worked in SIGI office.
One of my supervisors.
Teachers who have explained it to their classes.
Parent.
Just walked into the guidance center.
Sister.
My job application teacher.
At freshmen orientation.
Instructor for DAP 60 class.
Program planning seminar.
Yellow pages (phone book).
Student working at guidance center.

---

[a] Some of the responses have been slightly edited.

Table P5

Responses to Questions 42-88 of SIGI Evaluation Questionnaire for Experimentals

(Unless otherwise noted, all numbers except n's are percent.)

EVALUATION OF SIGI

Circle the grade that you would give SIGI on each of the following:

	A,	B,	C,	D, or	F
42. How interesting was SIGI to you? n = 77	53	36	9	1	0
43. How clear was SIGI in giving information? n = 77	64	29	6	0	1
44. Overall, how good is SIGI? n = 76	46	42	8	1	3

Circle the grade that shows how useful SIGI was in each of the following:

	A,	B,	C,	D, or	F
45. Helping you decide which occupation to prepare for. n = 77	21	35	25	14	5
46. Helping you become more aware of your values. n = 76	71	18	7	3	1
47. Showing you the relationship between values and career decisions. n = 77	61	27	6	4	1
48. Helping you find out which occupations might fit your values. n = 77	40	38	14	4	4
49. Helping you get information about occupations. n = 77	53	27	17	1	1
50. Helping you understand grade predictions expressed in probabilities. n = 77	25	40	25	5	5
51. Helping you estimate probabilities of success in one or more programs. n = 77	23	39	27	6	4
52. Giving information about programs of study at your school. n = 77	27	30	21	14	8
53. Helping you plan a program appropriate for an occupation you are considering. n = 76	24	36	25	9	7
54. Helping you learn how to make career decisions. n = 77	30	47	16	6	1

55. What role has SIGI played in your occupational choice? n = 77
12 (1) SIGI helped me to choose an occupation.
43 (2) SIGI helped confirm the choice I had already made.
39 (3) SIGI suggested other things which I am considering.
8 (4) SIGI provided little or no help.

Table P5 (continued)

To get help with occupational and educational decisions, you can go to SIGI and to a counselor. For each of the following, (56-63), put a check under the heading which, in your opinion, represents the best source of help.

	SIGI Alone	Counselor Alone	SIGI & Counselor
56. Plan program of study n = 76	11	30	59
57. Get information about occupations n = 75	32	9	59
58. Confirm an occupational choice n = 74	26	15	59
59. Find occupations that fit values n = 74	62	4	34
60. Find out about financial aid n = 71	7	55	38
61. Make values more clear n = 74	65	7	28
62. Resolve conflicts about occupational choice n = 75	11	20	69
63. Estimate chances of success in a program n = 74	34	14	53

64. Have you scheduled or do you plan to schedule an appointment with a counselor as a result of using SIGI? n = 76
88 (1) Yes 12 (2) No

65. If yes, what was or will be the purpose of this visit? Check all the topics you discussed or plan to discuss. n = 341
10 (1) Your values
16 (2) Occupational choice
12 (3) Occupational information
9 (4) Curriculum choice
12 (5) Course selection
11 (6) Chances for success
5 (7) Program approval
3 (8) Family pressures
7 (9) Financial aid
2 (10) SIGI print-outs
2 (11) Other (please explain: ______)

66. In using SIGI, did the occupations of interest to you show up on the list determined by your values? n = 75
75 (1) Yes 25 (2) No

67. Were there any occupations missing from SIGI that you were interested in?
___ (1) Yes ___ (2) No

If yes, name them: ______

68. Compared to other kinds of occupational information, how would you rate the occupational information presented in SIGI? n = 76
76 (1) Better
21 (2) About the same
3 (3) Worse

69. SIGI has 28 questions you can ask about occupations. Are there other questions about occupations that you wish had been in SIGI? n = 74
15 (1) Yes 85 (2) No

If yes, what question(s) would you add to the SIGI list?

______

Table P5 (continued)

70. How would you rate SIGI's writing style and vocabulary? n = 76
0 (1) Too difficult
88 (2) Just right
12 (3) Too simple

71. Did you find sexual, racial, or other bias in SIGI? n = 76 3 (1) Yes 97 (2) No

If yes, give examples:

72. Below is a list of problems that may have occurred in using SIGI. Check any that you experienced: n = 98
9 (1) I did not understand some of the directions.
14 (2) The writing on the screen strained my eyes.
10 (3) I had to wait too long for an appointment to use SIGI.
8 (4) There was too much reading.
13 (5) I felt rushed while using SIGI.
16 (6) The computer broke down while I was using SIGI.
0 (7) The writing on the screen was jumbled.
10 (8) I wanted to sign off SIGI, but couldn't.
18 (9) Other (please explain: ______________________________)

73. How often did you request a print-out on SIGI? n = 76
74 (1) Frequently
25 (2) Sometimes
1 (3) Once or twice
0 (4) Never

74. After using the computer, did you do anything to get more information on your own? n = 76
67 (1) Yes 33 (2) No

75. If yes, what did you do? n = 77
40 (1) Read
39 (2) Spoke to people in the occupation
4 (3) Used audiovisual material
17 (4) Other (please explain: ______________________________)

76. How much time did you spend on SIGI? n = 77
4 (1) 1-2 hours
61 (2) 2-4 hours
35 (3) 4-6 hours or more

77. Did you go all the way through SIGI (including the Strategy section)? n = 77
97 (1) Yes 3 (2) No

78. Over how many sessions did you use SIGI? n = 77
3 (1) One
52 (2) Two
45 (3) Three or more

79. Do you think you would profit from further use of SIGI? n = 76 58 (1) Yes 42 (2) No

80. If yes, how many additional sessions would you like? n = 43
47 (1) One
33 (2) Two
21 (3) Three or more

Table P5 (continued)

81. Which sections would you use most? n = 141
21 (1) Values
11 (2) Locate
18 (3) Compare
9 (4) Prediction
26 (5) Planning
16 (6) Strategy

82. Is there anything SIGI didn't cover that you would like it to cover? n = 75
25 (1) Yes 75 (2) No

If yes, please explain:

83. Is there any area you wish SIGI had covered more fully? n = 75 35 (1) Yes 65 (2) No

If yes, please explain:

84. What did you like best about SIGI? (check one only) n = 74
38 (1) Learning about my values
20 (2) Finding occupations that fit my values
20 (3) Getting occupational information
0 (4) Getting grade predictions
4 (5) Learning what courses to take to prepare for an occupation
3 (6) Learning a strategy for making decisions
14 (7) Learning how values affect decisions
1 (8) Other (please explain:)

85. What you did on SIGI was completely private. How important is this fact to you? n = 76

0		1		2		3		4
18	9	18	3	16	1	12	4	18
privacy made no difference								very important

86. Have you advised friends at your college to use SIGI? n = 76 79 (1) Yes 21 (2) No

87. If yes, how many? n = 61
54 (1) 1-2
36 (2) 3-5
10 (3) 6 or more

88. Is there anything else you would like to tell us that would help us improve SIGI?

Table P6

Experimental Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #65 (Purpose of Appointment with Counselor)

My personal attributes as they pertain to a field.
To go over SIGI results. (Mentioned by 2 students.)
Effectiveness of SIGI. I decided both seeing a counselor and using SIGI were valuable.
How do I know what is right for me?
Required visit.
Related jobs to work towards major goal.
Duration of time I should spend in school.
Transferring to a 4-year school.
Teaching information.
Had to go, for written information.

Question #67 (Occupations of Interest Missing from SIGI)[b]

Drama teacher.
Agriculture.
Translator.
Printing.
Anthropology.
Science related fields.
Museology.
T.V. stagehands.
Travel agent.
Bio-Chemist.
Gourmet Cook (not a chef)
Metallurgy. (Mentioned by 3 students.)
Engineering technology. (Mentioned by 3 students.)
Writing. (Mentioned by 2 students.)
Different facets of law and accounting.
Media specialist.
Chiropractor.
Criminology.
Air traffic controller.
Christian missionary fields.
Entomology.
Researcher (historical).
Editing.
Record producer & publisher.

Question #69 (Additional Questions Students Would Like to Ask)[b]

What personal qualities must I have?
How difficult is actual preparation?
Financial aid information.
Information on areas to get work experience in the field.
Suggestions for study improvement.
Further details about job description and availability.
Are Christian values important to the student?
In what position will I be happy?
More variety in careers offered.
A way to plan for your personal situation.
The last part of SIGI was not available when I entered the program. If it is available now, part 6 would answer my questions.
A way for a student to put a question of his own to the computer.

Table P6 (continued)

Question #69 (continued)

How creative can a person be in this occupation?
Do you have to take your work home with you?
Some of the answers were poor.
Predict job opportunities for near future.
More information for foreign students.

Question #71 (Examples of Bias in SIGI)

SIGI did not tell you when sexual bias exists in an occupation. For example, the U. S. Forest service is hiring more females to make up for a previous imbalance. This was not mentioned in SIGI.
Should throw some light-hearted remarks instead of being ultra straight and impersonal.
Lack of Christian occupations.
Many jobs I liked SIGI said women can't get into easily, and I should check others.

Question #72 (Other Problems in Using SIGI)

Not enough occupational choices.
Two hours was a bit long.
You couldn't sign off in the middle of a section without erasing your work.
It is redundant.
Wanted to erase an answer.
At times I felt rushed, but there was actually no reason to.
I made a mistake. Pushed wrong button and lost information I wanted printed.
I wanted to return to a part of the section I was in but couldn't without starting over. (Mentioned by 2 students.)
Made mistake and signed off--couldn't restart.
Could not ask direct questions.
Too many examples.
Problem with grade prediction (chances out of 100).
No printout. (Mentioned by 2 students.)
Didn't move fast enough for me.
Takes too much time to print out.
Prints even if you don't want printout. (Mentioned by 2 students.)
Computer delays.
Deletion difficulties.

Question #75 (Other Steps Taken to Get More Information After Using SIGI)

Talked with counselor and friends in forestry.
Counseling. (Mentioned by 6 students.)
Went to different employers to find out about requirements for a job of interest to me.
Consulted chiropractic college requirements.
Wrote for information. (Mentioned by 3 students.)

Table P6 (continued)

Question #82 (Additional Topics SIGI Could Have Covered)[b]

Personality factor in job choice and prediction.
SIGI's selection of job occupations was very narrow. I feel SIGI should show some occupations that would be possible for a certain major being considered.
More information on colleges to enter for certain occupations.
If you were not right for a job, I would like some SIGI alternatives listed after that.
More occupations.
Part 6 [presumably Strategy].
Applying my personal situation to my career situation.
What position or job is needed to be happy.
To find out if the user is interested in God and if so to give the user more choices directly linked to Christian jobs.
Remarks by people established in careers shown by SIGI.
I think the main sections were very helpful.
The comparison of personal aptitude to job with the student who has the schooling on the job.
More in-depth discussions of the careers.
More information on colleges, more comparative information on occupations.
Better occupational information. SIGI did not cover people's needs. What to do when you find a job--not enough information about it.
I think it should be more exact on the locations of certain jobs--states, etc.
Printing occupation not in SIGI.
It said nothing of those working already. It might mention the "stop-out."
Deeper emphasis on personal qualities as they relate to a given field, geographic emphasis on job availability.

Question #83 (Areas That Should Have Been Covered More Fully)[b]

Schools appropriate to a chosen career.
Would like to see the use of more material in the Prediction system--not just one key course, but perhaps 3-5.
It should have shown different fields under selected majors.
More advice on courses that are beneficial to major and upper division courses at transfer colleges.
Explanation of careers--too brief.
Locating more jobs.
Jobs and college planning available.
I wish it had more jobs in my field of interest; perhaps there are none, but I hope that's not true. The only jobs listed in History--Humanities field are teaching jobs, practically.
Values. (Mentioned by 2 students.)
Locate.
Job security. Maybe a few current statistics that would definitely show an overcrowded situation.
I would have liked more than 20 occupations listed when locating occupations.

Table P6 (continued)

Question #83 (continued)

More emphasis on strategy.
Describing jobs and salary and hours.
How I may find a quicker way of entering the field, while continuing my education.
The occupations that fit my values. The first two that SIGI chose for me did not interest me too much. When I gave my own choice, SIGI responded favorably to it--although it wasn't one of its first two choices.
Prediction.
Strategy and planning did not help much because there was little information. Some of it was kind of ridiculous, game-playing.
GPA required for 4-year college transfer from PCC. Also, difference between the two public colleges of Forestry in California; Berkeley and Humboldt state.
More personal and psychological testing.
More occupational choices.

Question #84 (Other Things Liked Best About SIGI)

Values.
My own interest in the computer's complexity.

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[a] Some of the responses have been edited slightly.

[b] In some cases students suggested occupations or innovations already in SIGI.

Table P7

Suggestions for Improvements in SIGI Given by Experimentals in Response to Question #88[a]

Promote the program more. Especially for entering students. I used SIGI "after" graduating from P.C.C. to confirm my direction and choice of occupation. I would have liked to use it at the beginning of my program at P.C.C.

I feel the prediction section is so general and weak that it is pretty useless. For example, it predicted higher grades for me in courses that are not in my primary field of interest.

More computers would help ease the waiting period between sessions.

When it says more than 20 occupations fit your values and they ask you to change something to reduce the number, I would like to see the other occupations also. The one I want just might be in the other group.

It seems to be good for the person who is completely undecided. But for someone who knows their strengths and weaknesses and their basic area of interest--not much help.

All examples were too long and boring.

I like to take my time--time limits somewhat short especially if problems occur--sometimes repeating sections.

You should stress field of interest a bit more. A person wouldn't want to take a job that was not interesting to them. A profession should be stimulating.

I can see how (SIGI) could be very useful to all who used it, if it were to be re-programmed with religion. If religion is removed...then the program is violating our legal right to freedom of religion. The lack of religion in the values system...is surpressing my right of freedom of religion (which is)...a violation of my constitutional rights.

(a) For someone undecided in a career it was helpful to an extent, but I still feel uncertain in making a decision, (b) SIGI is more for the person who is pretty well decided on an occupation but wants to weigh everything about that job.

(a) When getting the information at the end of the program, it is too slow to have to get out information, especially when you only want to know about one, (b) I didn't like the part of the program where you're trying to match occupations to your values. Sometimes you have to warp your values to get a read-out.

Have salaries on occupations up-to-date.

Keep up the good work!!

Table P7 (continued)

On various sections (e.g., planning), many of the automatic print sections repeated many times. There should be some way to cut down on this information and have it read out once.

I would love to see more SIGI computers in more schools. I feel fortunate to have had the opportunity to use SIGI, and I only hope we can keep it and let more (people) use it in the (future).

Some way of determining how much in demand your occupational choice is, and how competitive hiring practices are.

Let the student know he or she has all the time he or she needs (as long as by prior appointment) and that copies may be made as often as desired.

I would have liked it better if SIGI could have been reserved one whole day per student. My appointments were spread out over a period of four months. I knew I was pressed for time and so I hurried through. I would have liked more time.

SIGI is an essential instrument to be used and expanded in the future. Everyone I know that has gone through SIGI has found it beneficial. Possibly SIGI should be required of entering freshmen, especially at the community college level.

SIGI should be put in more junior colleges. It helped me out a lot, and there are a lot more students like me who need direction for planning occupations, and what to do to prepare for them. Thanks for sending SIGI to Pasadena City College.

(a) I think it would help if SIGI were a class project for some classes like a lecture class for writing improvement, (b) There are a lot of students who are taking subjects that aren't related to their major. SIGI could help them decide.

Only the future will tell!!

I think that it could be made known to the students, that the prediction system can fail.

I liked not having to deal with a counselor, who wouldn't have come up with half the information that SIGI did. Thanks.

I dislike choosing one answer that was written by someone else which never seems to satisfy me as the appropriate answer. In SIGI and the questionnaires I realize it simplifies matters, but is surface evaluation. I was grateful for the chance to use SIGI.

Make sure SIGI doesn't break down too often. Otherwise it is a pretty good system, considering the user programs what SIGI is going to say.

Have different courses for people that have different amounts of knowledge about their occupations.

Table P7 (continued)

Thank you for the very helpful opportunity.

Make it more flexible. Several times I was forced to continue with an occupation I wanted out of, and several times I was forced to take printouts I didn't want. Also, there were some printouts I wanted but couldn't get.

Add more information on colleges such as student-teacher ratio, etc. I liked the overall tone of SIGI.

(a) Better list of job possibilities and occupational information, (b) After a person has been on SIGI a counselor should be there to help him, and maybe have information that SIGI doesn't have.

(a) I felt a wider selection of occupations was needed, which I'm sure will happen as time goes on, (b) SIGI was an interesting, enjoyable experience even though it had hardly any info pertaining to my occupational field.

Under the options it gives you, make a way for a person to give input if none of the options apply to a person.

Having to pick a field of interest when you are undecided is difficult and it would take weeks of testing to go through all of them. Maybe if there was an extra section before the choices to help decide what interests and career a person might be interested in.

Make SIGI more available.

Update the availability and salary info and put more emphasis on geography--also. Incorporate some rudimentary form of psychological testing. (It helps to get more honest and pertinent info when the interviewer is warm and friendly.)

I think that instead of talking to a counselor at the end of SIGI, maybe talking to one once or twice during SIGI's tests might help. SIGI could be a bit more flexible. The student should be able to start and stop at convenient times; also a way to tell the machine you don't want to go through a whole series of questions on a job.

Overall, SIGI is very effective and helpful the way it is.

My salary expectations and security values given to SIGI was what I decided gave me the occupational list that suited my values. However, I felt that perhaps my units in Data Processing at P.C.C. could have affected it. The machine should clarify if any school data is in the computer--according to your name.

---

[a] Some of the responses have been edited slightly.

Table P8: SIGI EVALUATION QUESTIONNAIRE FOR COUNSELORS

BACKGROUND INFORMATION

1. What percent of your time do you spend in career counseling (as opposed to personal counseling, academic advisement, etc.)?

0 (1) None
2 (2) 25% or less
3 (3) 25-50%
2 (4) 50-75%
1 (5) 75-100%

2. On the average, how many students do you see each week for career counseling?

0 (1) None
1 (2) 1-5
1 (3) 5-10
1 (4) 10-20
5 (5) 20 or more

3. How long are most sessions for career counseling?

2 (1) less that 30 minutes
6 (2) 30 minutes to an hour
0 (3) one to two hours

Please indicate whether you agree or disagree with each of the following statements about computer-based guidance systems.

	Agree	Disagree	Not sure
4. Computer-based guidance systems are a passing fad.	1	7	0
5. Computer-based guidance systems can relieve counselors of many routine duties, leaving more time for professional counseling activities.	7	1	0
6. Computer-based guidance systems are a potential threat to the jobs of counselors.	0	7	1
7. I will probably never make much use of computer-based guidance systems in my work with students.	1	7	0
8. Computer-based guidance systems are capable of helping students make rational career decisions.	7	0	0

EXPERIENCE WITH SIGI

9. Have you attended a SIGI Counselors' Workshop? 3 (1) Yes 5 (2) No

10. Have you had a chance to use SIGI yourself? 6 (1) Yes 2 (2) No

11. If so, which of the SIGI subsystems have you been through?

	Once	More than once
(1) VALUES	3	3
(2) LOCATE	3	3
(3) COMPARE	3	2
(4) PREDICTION	2	2
(5) PLANNING	2	2
(6) STRATEGY	1	2

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Table P8 (continued)

12. Have you referred students to SIGI? 8 (1) Yes 0 (2) No

If so, how many?_______

For what reasons?____

13. How have most students at your college reacted to SIGI?

7 (1) Favorably

0 (2) Unfavorably

1 (3) No opportunity to observe

14. Have students come to you with their SIGI printouts? 6 (1) Yes 2 (2) No

What problems, if any, have you had in helping students interpret their printouts?

15. Have students come to you with problems related to use of the SIGI terminals? 3 (1) Yes 5 (2) No

If so, what kinds of problems have they encountered?____________________________

> Prior to having SIGI at your college, to what degree was each of the following (Items 16-22) a problem to you in your role as a counselor?

	Major problem	Minor problem	No problem	Not relevant to me
16. Getting students to read occupational information.	3	3	1	0
17. Keeping up-to-date on occupational information.	6	1	0	1
18. Identifying sources of occupational information.	0	6	0	1
19. Finding time to see all the students who want the help of a counselor.	4	0	3	0
20. Identifying students who need help with their educational and occupational plans.	2	4	1	0
21. Selecting appropriate programs of study for students' career goals.	1	2	4	0
22. Other:____________				

23. Has SIGI had an impact on any of the above problems? 5 (1) Yes 1 (2) No

If so, which ones? (Circle responses.) (16) (17) (18) (19) (20) (21) (22)

Please explain: 5 3 1 2 2 0 1

Table P8 (continued)

Have you noticed a change in any of the following (Items 24-27) now that SIGI is available to students at your college?

	Increase	Decrease	No change	No opportunity to observe
24. Number of students you are able to see.	1	0	5	1
25. Amount of time you spend doing career counseling.	4	0	3	1
26. Length of career counseling sessions.	4	0	3	1
27. Quality of group discussions about values and career decisions.	3	0	2	3

28. Do you know which of your students have used SIGI and which have not?

6 (1) Yes   2 (2) No

If so, in your opinion do students who have used SIGI rate higher than students who have not used it in their ability to:

	Yes	No	No opportunity to observe
(1) express clearly the satisfactions they want from an occupation?	2	2	1
(2) state their primary occupational choice?	3	1	1
(3) mention alternative possibilities?	3	1	1
(4) indicate sound reasons for their preference?	3	1	1
(5) show they are well-informed about their first-choice occupation?	2	2	1
(6) decide what programs of study are suitable for each occupation being considered?	4	0	1
(7) evaluate their chances of success in programs being considered?	2	2	1

29. How do you think students should gain access to SIGI? (Check one or more.)

3 (1) Terminals should be available to students on a first-come, first-served basis, and follow-up sessions with counselors should be optional.
1 (2) Students should be required during their first year of college to use SIGI and schedule a follow-up session with a counselor.
4 (3) Counselors should refer students to SIGI and require a follow-up session afterward.
4 (4) SIGI should be used as part of a career guidance unit in a classroom course.
1 (5) Other:

SUGGESTIONS FOR IMPROVEMENT

30. What occupations do students frequently ask about that are missing from SIGI?

31. Are there other additional occupations that you would like to see included in SIGI?

1 (1) Yes   0 (2) No

If so, please list them:

32. Are SIGI's writing style and vocabulary appropriate for your students?

6 (1) Yes   0 (2) No

If not, what changes would you suggest?

Table P8 (continued)

33. How does the occupational information in SIGI compare to other sources available to students at your college?
   - 5 (1) Better
   - 2 (2) About the same
   - 0 (3) Worse

34. Did you find any sexual, racial, or other bias in SIGI? 1 (1) Yes 5 (2) No

   If so, give examples:

35. What suggestions do you have for improving SIGI, the Handbook for Counselors, or the Counselors' Workshops?

OPTIONAL INFORMATION

Members of the SIGI research staff are especially interested in hearing about any personal experiences which you or your colleagues may have had in working with SIGI. Please use the space below to record any observations, amusing anecdotes, students' comments, etc., which you would like to share with us.

Name: College:

PLEASE RETURN YOUR QUESTIONNAIRE IN THE ENVELOPE PROVIDED

THANK YOU FOR YOUR COOPERATION

Table P9

Counselors' Responses to Open-Ended Items on the Counselors' Questionnaire[a]

Question 12 (Reasons for Referring Students to SIGI)

I feel it is a great aid to many students and has a great wealth of information.

Evaluation.

Needed help with finding a possible career goal.

Help them analyze their values and educational and career choices.

Pilot project. So far little opportunity to refer. Anticipate doing so later.

Career decisions.

Students needed objective, extensive guidance with career goals.

Question 14 (Problems Associated with Printouts)

None (2 responses).

None--once I familiarized myself with the material.

In some cases, students did not pursue the information long enough to get the meat available. One student gave up because law (his choice) did not appear. He chose not to ask for it.

Correlating occupational scales with value themes.

They don't always print out what I would like to see.

Question 15 (Problems Associated with the Terminals)

Some found it difficult to relate to the definitions of the values.

Mechanical/interpretation.

Technical ones that have been worked out.

Question 22 (Other Problems Associated with Career Counseling)

Career Guidance Center maintains materials.

Motivating students to seek help in career area.

Question 23 (Impact of SIGI on Counseling Problems)

They literally have lots of information at their fingertips.

They have been interested in trying SIGI and so have been started on a search.

16--ease of access to information, fun; 19--student has more time to explore occupations without taking as much counselor time.

SIGI helps student to gain insight into his values which in turn assists him with possible career choices.

Table P9 (continued)

Question 29, Item 5 (Other Ways of Making SIGI Available to Students)

Made available for student self-referral.

Question 30 (Occupations Suggested by Students for Addition to SIGI)[b]

Self-employed.

Those occupations dealing with TV & Radio, Music & Art, Psychology, Business.

Keep adding alternate careers related to major areas.

Foreign Service.

Question 31 (Occupations Suggested by Counselors for Addition to SIGI)[b]

Theatre jobs--directing, etc.

Yes, those that are new and have high employment possibilities.

Question 32 (Suggested Changes in Writing Style)

[Writing style and vocabulary appropriate], except in some definition statements on values.

The non-reader has trouble.

Question 34 (Examples of Bias in SIGI)

A returning student who has been out of school for a few years still is held to poor high school grades. It may be more valid to give more weight to recent college work.

Question 35 (Suggestions for Improvement)

[Information about] incomes should be regional and updated. Some information on going into counseling in California is incorrect. Handbook is too wordy, too lengthy, and distracting.

Make the Handbook more readable. Many more occupations need to be added to gain its true potential.

Expand occupations.

Optional Information

Bright students get the most from SIGI. Low ability students do not have enough choices. Students are enthusiastic.

I found that there is much repetition of occupations in the different interest fields. And if interest field is not one of the 5 chosen values, the occupations come out the same. I really like SIGI.

---

[a] Some of the responses have been edited slightly.

[b] Some occupations in these fields are already in SIGI.

Table P10

Breakdown of Sample by Age, Sex, and Enrollment Status

Factor	%
Age	
18 or under	42.61
19-21	26.59
22-24	18.66
25 and over	12.13
Sex	
Male	49.25
Female	50.75
Enrollment status	
About to enter	7.64
1st semester or quarter	33.23
Completed 1 or more semesters	45.70
Other	13.44

Table P11

Initial Status with Respect to Career Decisions

VALUE STATUS (N= 600)	FREQ	%
I KNOW WHAT I WANT.	147	24.50
GENERAL IDEA OF WHAT I WANT.	316	52.67
WOULD KNOW IF I SAW IT.	40	6.67
I'M IN THE DARK.	97	16.17

OCCUPATION STATUS (N= 600)	FREQ	%
I CAN LIST 3 OCCUPATIONS	61	10.17
1 OR 2 OCCUPATIONS THAT FIT.	107	17.83
NOT SURE THEY FIT MY VALUES.	120	20.00
I NEED LOTS OF INFORMATION.	312	52.00

PREDICTION STATUS (N= 600)	FREQ	%
PREDICT GRADES IN ANY PROGRAM.	222	37.00
PREDICT GRADES IN SOME PROGRAMS.	238	39.67
GENERAL IDEA OF MY GRADES.	95	15.83
I CAN'T PREDICT MY GRADES.	45	7.50

PLANNING STATUS (N= 600)	FREQ	%
KNOW WHICH PROGRAM TO ENROLL IN.	106	17.67
GENERAL IDEA WHICH IS BEST.	226	37.67
DON'T KNOW WHICH PROG. TO TAKE.	268	44.67

Table P12

Means and Standard Deviations for the 10 SIGI Values

	Unrestricted[a]		Restricted[b]	
Value	$\bar{X}$	S.D.	$\bar{X}$	S.D.
Income	5.36	1.68	4.81	1.68
Prestige	4.50	2.01	3.13	1.52
Independence	5.37	1.74	4.61	1.65
Helping Others	5.25	2.21	4.34	2.25
Security	5.54	1.95	4.51	1.87
Variety	5.30	1.96	4.17	1.72
Leadership	4.70	2.06	3.63	1.75
Interest Field	5.89	1.78	5.47	1.71
Leisure	3.87	1.83	3.18	1.68
Early Entry	3.20	2.38	2.16	1.98

---

[a] Students weighted each value on a scale ranging from 0 (no importance) to 8 (maximum importance), with no restriction on the magnitude of the sum of the weights.

[b] Students were forced to adjust their value weights to sum to exactly 40 points.

Table P13

Frequency with Which Each of the Six Interest Fields Was Selected

Interest Field (N = 1011)[a]	Freq[a]	%
Scientific	141	13.95
Technological	73	7.22
Administrative	143	14.14
Personal Contact	328	32.44
Verbal	211	20.87
Aesthetic	115	11.37

[a] The n and frequency represent the number of times fields were selected. Students may choose more than once.

Table P14

Frequency with Which Values Were Used for Retrieval in Locate

VALUES USED IN LOCATE (N = 12,410[a])	FREQ	%
Income	1858	14.97
Prestige	665	5.36
Independence	1590	12.81
Helping Others	1276	10.28
Security	1368	11.02
Variety	1404	11.31
Leadership	853	6.87
Interest Field	1928	15.54
Leisure	909	7.32
Early Entry	559	4.50

---

[a] The _n_ represents the total number of selections, not the number of students using the Locate system.

Table P15

Level or Category of Specification Used in Locate

INCOME SPEC LEVELS (N= 1858)	FREQ	%
LESS THAN $8,000 IS OK.	92	4.95
MORE THAN $8,000.	276	14.85
MORE THAN $11,000.	622	33.48
MORE THAN $15,000.	582	31.32
MORE THAN $20,000.	286	15.39

PRESTIGE SPEC LEVELS (N= 665)	FREQ	%
BELOW AVERAGE IS OK.	72	10.83
AVERAGE AMOUNT.	253	38.05
MORE THAN AVERAGE AMOUNT.	258	38.80
GREAT AMOUNT	82	12.33

INDEPENDENCE SPEC LEVELS (N= 1590)	FREQ	%
BELOW AVERAGE IS OK.	107	6.73
AVERAGE AMOUNT.	648	40.75
MORE THAN AVERAGE AMOUNT.	671	42.20
GREAT AMOUNT	164	10.31

HELP OTHERS SPEC LEVELS (N= 1276)	FREQ	%
BELOW AVERAGE IS OK.	76	5.96
AVERAGE AMOUNT.	316	24.76
MORE THAN AVERAGE AMOUNT.	462	36.21
GREAT AMOUNT	422	33.07

SECURITY SPEC LEVELS (N= 1368)	FREQ	%
BELOW AVERAGE IS OK.	61	4.45
AVERAGE AMOUNT.	539	39.40
MORE THAN AVERAGE AMOUNT.	581	42.47
GREAT AMOUNT	187	13.67

VARIETY SPEC LEVELS (N= 1404)	FREQ	%
BELOW AVERAGE IS OK.	59	4.20
AVERAGE AMOUNT.	416	29.63
MORE THAN AVERAGE AMOUNT.	641	45.66
GREAT AMOUNT	288	20.51

LEADERSHIP SPEC LEVELS (N= 853)	FREQ	%
BELOW AVERAGE IS OK.	79	9.26
AVERAGE AMOUNT.	287	33.65
MORE THAN AVERAGE AMOUNT.	333	39.04
GREAT AMOUNT	154	18.05

Table P15 (continued)

INTEREST FIELD SPECS (N= 1928)	FREQ	%
	----	-
SCIENTIFIC.	302	15.66
TECHNOLOGICAL.	105	5.45
ADMINISTRATIVE.	283	14.68
PERSONAL CONTACT.	794	41.18
VERBAL.	212	11.00
AESTHETIC.	232	12.03

LEISURE SPEC LEVELS (N= 909)	FREQ	%
	----	-
SMALL AMOUNT IS OK.	43	4.73
LESS THAN AVERAGE AMOUNT.	81	8.91
AVERAGE AMOUNT	517	56.88
MORE THAN AVERAGE AMOUNT.	268	29.48

EARLY ENTRY SPEC LEVELS (N= 559)	FREQ	%
	----	-
5 OR MORE YEARS.	130	23.26
4 YEARS.	245	43.83
2 OR 3 YEARS.	137	24.51
1 YEAR OR LESS.	47	8.41

Table P16

OCCUPATIONS IN LOCATE-NOVICE & INITIATE (N= 10783[a] & 1859[b])

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	8	0.07	1	0.05
ADVERTISING COPYWRITER.	7	0.06	3	0.16
AIR COND, REFRIG, & HEAT MECH.	9	0.08	1	0.05
ACCOUNTANT.	12	0.11	11	0.59
AIRCRAFT MECHANIC.	2	0.02	0	0.00
APPLIANCE REPAIR TECHNICIAN.	2	0.02	0	0.00
ARCHITECT.	80	0.74	11	0.59
AUTOMOBILE SALESWORKER.	1	0.01	0	0.00
ARCH. TECH. AND DRAFTSMAN.	5	0.05	0	0.00
AVIONICS TECHNICIAN.	0	0.00	1	0.05
AUTOMOBILE MECHANIC.	4	0.04	0	0.00
ACTUARY.	44	0.41	33	1.78
BROADCAST TECHNICIAN.	9	0.08	1	0.05
BEAUTICIAN.	13	0.12	0	0.00
BOTANIST.	63	0.58	13	0.70
BOOKKEEPER.	3	0.03	3	0.16
BUSINESS MACHINE REPAIR TECH.	14	0.13	1	0.05
BANK OFFICER.	107	0.99	17	0.91
BANK TELLER.	6	0.06	2	0.11
COMMERCIAL ARTIST.	1	0.01	0	0.00
CLOTHING DESIGNER.	20	0.19	3	0.16
CHEMICAL ENGINEER.	98	0.91	24	1.29
CHEMIST.	20	0.19	8	0.43
CLERGY.	124	1.15	10	0.54
COMPUTER OPERATOR.	6	0.06	4	0.22
COMPUTER PROGRAMMER.	12	0.11	6	0.32
CIVIL ENGINEER.	279	2.59	45	2.42
DENTAL ASSISTANT	2	0.02	0	0.00
DENTIST	282	2.62	58	3.12
DENTAL HYGIENIST	8	0.07	2	0.11
DRAFTSMAN	14	0.13	2	0.11
DIETITIAN	85	0.79	14	0.75
DIESEL MECHANIC	8	0.07	0	0.00
DANCER AND DANCING TEACHER	2	0.02	0	0.00
ECONOMIST	44	0.41	30	1.61
ELECTRICAL ENGINEER	50	0.46	11	0.59
ENGINEERING TECHNICIAN	12	0.11	0	0.00
ELECTRONICS TECHNICIAN	30	0.28	2	0.11
FINE ARTIST/PRIVATE ART TEACHER	31	0.29	6	0.32
FUNERAL DIRECTOR	91	0.84	20	1.08
FLIGHT ENGINEER	44	0.41	1	0.05
FLIGHT ATTENDANT	2	0.02	2	0.11
FORESTER	125	1.16	36	1.94
GEOGRAPHER	15	0.14	7	0.38
HOME ECONOMIST	185	1.72	27	1.45
HOTEL/MOTEL MANAGER	69	0.64	20	1.08
INSURANCE AGENT	19	0.18	3	0.16
INTERIOR DESIGNER/DECORATOR	38	0.35	5	0.27
INDUSTRIAL ENGINEER	253	2.35	48	2.58
INDUSTRIAL TRAFFIC MANAGER	18	0.17	10	0.54
INDUSTRIAL DESIGNER	112	1.04	11	0.59
INSTRUMENT REPAIR TECHNICIAN	1	0.01	0	0.00
SCIENCE LAB TECHNICIAN	0	0.00	0	0.00
LIBRARIAN	106	0.98	17	0.91
LABOR RELATIONS SPECIALIST	144	1.34	35	1.88
LIBRARY TECHNICIAN	4	0.04	1	0.05

Table P16 (continued)

LAWYER	400	3.71	58	3.12
MATHEMATICIAN	67	0.62	17	0.91
PHYSICIAN	376	3.49	62	3.34
MECHANICAL ENGINEER	79	0.73	18	0.97
METEOROLOGIST	53	0.49	17	0.91
MEDICAL RECORD ADMINISTRATOR	25	0.23	4	0.22
MEDICAL LAB TECHNICIAN	0	0.00	0	0.00
MODEL	1	0.01	0	0.00
MARKET RESEARCHER	17	0.16	5	0.27
MANUFACTURER'S SALESWORKER.	10	0.09	0	0.00
MEDICAL TECHNOLOGIST.	16	0.15	1	0.05
MUSICIAN/MUSIC TEACHER.	32	0.30	4	0.22
MACHINIST.	10	0.09	2	0.11
NURSERYMAN/LANDSCAPER.	36	0.33	4	0.22
NEWSPAPER REPORTER.	8	0.07	4	0.22
OCEANOGRAPHER.	78	0.72	20	1.05
OPTICIAN.	6	0.06	0	0.00
OCCUPATIONAL THERAPIST.	172	1.60	20	1.08
PURCHASING AGENT.	2	0.02	3	0.16
POLICE OFFICER.	18	0.17	2	0.11
PUBLIC HEALTH SPECIALITST.	113	1.05	18	0.97
PILOT.	454	4.21	5	0.27
POLITICAL SCIENTIST.	195	1.81	40	2.15
PHARMACIST.	18	0.17	2	0.11
NURSE, PRACTICAL.	2	0.02	0	0.00
PHOTOGRAPHER.	35	0.32	1	0.05
PUBLIC RELATIONS WORKER.	6	0.06	3	0.16
PHYSICIST.	16	0.15	0	0.00
PHYSICAL THERAPIST.	54	0.50	3	0.16
PERSONNEL INTERVIEWER.	144	1.34	32	1.72
PRODUCTION MANAGER.	102	0.95	35	1.88
PSYCHOLOGIST.	385	3.57	62	3.34
RADIO/TV ANNOUNCER.	12	0.11	1	0.05
REHABILITATION COUNSELOR.	314	2.91	49	2.64
RECEPTIONIST.	8	0.07	2	0.11
REAL ESTATE AGENT	8	0.07	1	0.05
NURSE, REGISTERED.	22	0.20	6	0.32
RESPIRATORY THERAPIST.	27	0.25	2	0.11
RETAIL STORE MANAGER.	39	0.36	12	0.65
RADIO/TV SERVICE TECHNICIAN.	3	0.03	0	0.00
RECREATION WORKER.	54	0.50	12	0.65
SYSTEMS ANALYST	44	0.41	9	0.48
SOIL CONSERVATIONIST.	178	1.65	41	2.21
SECURITIES BROKER.	74	0.69	15	0.81
SECRETARY.	28	0.26	8	0.43
SCHOOL COUNSELOR.	335	3.11	36	1.94
STATISTICIAN.	23	0.21	8	0.43
SOCIAL SERVICE AIDE.	25	0.23	5	0.27
SPEECH PATHOLOGIST/AUDIOLOGIST.	290	2.69	37	1.99
SINGER AND SINGING TEACHER.	12	0.11	1	0.05
SURVEYOR.	15	0.14	2	0.11
SOCIAL WORKER.	84	0.78	12	0.65
TEACHER AIDE.	12	0.11	3	0.16
TELEPHONE CRAFTSWORKER.	0	0.00	0	0.00
TOOL AND DIE MAKER.	5	0.05	0	0.00
TEACHER, ELEMENTARY SCHOOL	135	1.25	21	1.13
ZOOLOGIST.	63	0.58	13	0.70
TECHNICAL WRITER.	4	0.04	2	0.11
TYPIST.	3	0.03	0	0.00
URBAN PLANNER.	192	1.78	29	1.56

Table P16 (continued)

VETERINARIAN.	84	0.78	24	1.29
WASTEWATER TREATMENT OPERATOR.	0	0.00	0	0.00
X-RAY TECHNOLOGIST.	3	0.03	0	0.00
TEACHER, ART.	251	2.33	32	1.72
TEACHER, BIOLOGY.	227	2.11	37	1.99
TEACHER, BUSINESS.	224	2.08	35	1.88
TEACHER, ENGLISH/LANG. ARTS.	172	1.60	27	1.45
TEACHER, FOREIGN LANGUAGE.	172	1.60	27	1.45
TEACHER, HISTORY/SOCIAL STUDIES.	172	1.60	27	1.45
TEACHER, INDUS. ARTS/VOC.TECH.	138	1.28	21	1.13
TEACHER, MATHEMATICS.	227	2.11	37	1.99
TEACHER, PHYSICAL EDUCATION.	111	1.03	19	1.02
TEACHER, PHYSICAL SCIENCE.	227	2.11	37	1.99
WELDER.	0	0.00	0	0.00
AEROSPACE ENGINEER.	14	0.13	4	0.22
FIREFIGHTER.	18	0.17	2	0.11
KEYPUNCH OPERATOR.	0	0.00	0	0.00
LANDSCAPE ARCHITECT.	89	0.83	9	0.48
OPERATING ROOM TECHNICIAN.	0	0.00	0	0.00
OPTOMETRIST.	235	2.18	30	1.61
TEACHER, EARLY CHILDHOOD.	37	0.34	6	0.32
TEACHER, SPECIAL EDUCATION.	172	1.60	27	1.45
CONSTRUCTION INSPECTOR.	40	0.37	5	0.27
CORRECTION OFFICER.	1	0.01	0	0.00
GEOLOGIST.	29	0.27	7	0.38
HOSPITAL ADMINISTRATOR.	131	1.21	37	1.99
PHYSICIAN'S ASSISTANT.	36	0.33	4	0.22
STENOGRAPHER.	3	0.03	0	0.00
EEG TECHNOLOGIST.	6	0.06	2	0.11
NURSING ASSISTANT.	0	0.00	0	0.00
FLORIST (RETAIL & DESIGNER).	9	0.08	3	0.16
TEACHER, VOCATIONAL/TECHNICAL.	73	0.68	21	1.13
CHEF/COOK.	11	0.10	4	0.22
PLUMBER.	29	0.27	4	0.22
FOOD SCIENTIST/TECHNOLOGIST.	39	0.36	11	0.59
TELEVISION PRODUCER/DIRECTOR.	36	0.33	1	0.05
INTERPRETER/TRANSLATOR.	50	0.46	7	0.38
LEGAL ASSISTANT.	35	0.32	16	0.86
FARMER/FARM MANAGER.	10	0.09	2	0.11

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[a] Retrievals for novices

[b] Retrievals for initiates

Table P17

OCCUPATIONS USED IN COMPARE (N= 3831[a])	FREQ	%
ACTOR AND ACTRESS.	32	0.84
ADVERTISING COPYWRITER.	29	0.76
AIR COND, REFRIG, & HEAT MECH.	8	0.21
ACCOUNTANT.	69	1.80
AIRCRAFT MECHANIC.	5	0.13
APPLIANCE REPAIR TECHNICIAN.	2	0.05
ARCHITECT.	22	0.57
AUTOMOBILE SALESWORKER.	3	0.08
ARCH. TECH. AND DRAFTSMAN.	2	0.05
AVIONICS TECHNICIAN.	4	0.10
AUTOMOBILE MECHANIC.	12	0.31
ACTUARY.	16	0.42
BROADCAST TECHNICIAN.	8	0.21
BEAUTICIAN.	15	0.39
BOTANIST.	26	0.68
BOOKKEEPER.	16	0.42
BUSINESS MACHINE REPAIR TECH.	4	0.10
BANK OFFICER.	41	1.07
BANK TELLER.	15	0.39
COMMERCIAL ARTIST.	23	0.60
CLOTHING DESIGNER.	11	0.29
CHEMICAL ENGINEER.	12	0.31
CHEMIST.	12	0.31
CLERGY.	29	0.76
COMPUTER OPERATOR.	24	0.63
COMPUTER PROGRAMMER.	44	1.15
CIVIL ENGINEER.	50	1.31
DENTAL ASSISTANT	9	0.23
DENTIST	30	0.78
DENTAL HYGIENIST	13	0.34
DRAFTSMAN	8	0.21
DIETITIAN	38	0.99
DIESEL MECHANIC	12	0.31
DANCER AND DANCING TEACHER	5	0.13
ECONOMIST	24	0.63
ELECTRICAL ENGINEER	14	0.37
ENGINEERING TECHNICIAN	8	0.21
ELECTRONICS TECHNICIAN	5	0.13
FINE ARTIST/PRIVATE ART TEACHER	20	0.52
FUNERAL DIRECTOR	15	0.39
FLIGHT ENGINEER	4	0.10
FLIGHT ATTENDANT	27	0.70
FORESTER	59	1.54
GEOGRAPHER	5	0.13
HOME ECONOMIST	50	1.31
HOTEL/MOTEL MANAGER	28	0.73
INSURANCE AGENT	16	0.42
INTERIOR DESIGNER/DECORATOR	32	0.84
INDUSTRIAL ENGINEER	45	1.17
INDUSTRIAL TRAFFIC MANAGER	8	0.21
INDUSTRIAL DESIGNER	20	0.52
INSTRUMENT REPAIR TECHNICIAN	2	0.05
SCIENCE LAB TECHNICIAN	2	0.05
LIBRARIAN	26	0.68
LABOR RELATIONS SPECIALIST	40	1.04

Table P17 (continued)

LIBRARY TECHNICIAN	1	0.03
LAWYER	134	3.50
MATHEMATICIAN	19	0.50
PHYSICIAN	50	1.31
MECHANICAL ENGINEER	20	0.52
METEOROLOGIST	13	0.34
MEDICAL RECORD ADMINISTRATOR	16	0.42
MEDICAL LAB TECHNICIAN	7	0.18
MODEL	10	0.26
MARKET RESEARCHER	18	0.47
MANUFACTURER'S SALESWORKER.	5	0.13
MEDICAL TECHNOLOGIST.	12	0.31
MUSICIAN/MUSIC TEACHER.	16	0.42
MACHINIST.	2	0.05
NURSERYMAN/LANDSCAPER.	19	0.50
NEWSPAPER REPORTER.	36	0.94
OCEANOGRAPHER.	33	0.86
OPTICIAN.	1	0.03
OCCUPATIONAL THERAPIST.	62	1.62
PURCHASING AGENT.	28	0.73
POLICE OFFICER.	30	0.78
PUBLIC HEALTH SPECIALITST.	38	0.99
PILOT.	29	0.76
POLITICAL SCIENTIST.	40	1.04
PHARMACIST.	20	0.52
NURSE, PRACTICAL.	8	0.21
PHOTOGRAPHER.	48	1.25
PUBLIC RELATIONS WORKER.	36	0.94
PHYSICIST.	8	0.21
PHYSICAL THERAPIST.	42	1.10
PERSONNEL INTERVIEWER.	66	1.72
PRODUCTION MANAGER.	38	0.99
PSYCHOLOGIST.	174	4.54
RADIO/TV ANNOUNCER.	33	0.86
REHABILITATION COUNSELOR.	124	3.24
RECEPTIONIST.	17	0.44
REAL ESTATE AGENT	15	0.39
NURSE, REGISTERED.	19	0.50
RESPIRATORY THERAPIST.	17	0.44
RETAIL STORE MANAGER.	25	0.65
RADIO/TV SERVICE TECHNICIAN.	9	0.23
RECREATION WORKER.	27	0.70
SYSTEMS ANALYST	15	0.39
SOIL CONSERVATIONIST.	48	1.25
SECURITIES BROKER.	25	0.65
SECRETARY.	26	0.68
SCHOOL COUNSELOR.	154	4.02
STATISTICIAN.	18	0.47
SOCIAL SERVICE AIDE.	20	0.52
SPEECH PATHOLOGIST/AUDIOLOGIST.	77	2.01
SINGER AND SINGING TEACHER.	8	0.21
SURVEYOR.	4	0.10
SOCIAL WORKER.	63	1.64
TEACHER AIDE.	9	0.23
TELEPHONE CRAFTSWORKER.	3	0.08
TOOL AND DIE MAKER.	3	0.08
TEACHER, ELEMENTARY SCHOOL	49	1.28
ZOOLOGIST.	36	0.94
TECHNICAL WRITER.	10	0.26
TYPIST.	10	0.26

Table P17 (continued)

URBAN PLANNER.	42	1.10
VETERINARIAN.	25	0.65
WASTEWATER TREATMENT OPERATOR.	1	0.03
X-RAY TECHNOLOGIST.	20	0.52
TEACHER, ART.	24	0.63
TEACHER, BIOLOGY.	12	0.31
TEACHER, BUSINESS.	22	0.57
TEACHER, ENGLISH/LANG. ARTS.	23	0.60
TEACHER, FOREIGN LANGUAGE.	23	0.60
TEACHER, HISTORY/SOCIAL STUDIES.	37	0.97
TEACHER, INDUS. ARTS/VOC.TECH.	24	0.63
TEACHER, MATHEMATICS.	17	0.44
TEACHER, PHYSICAL EDUCATION.	55	1.44
TEACHER, PHYSICAL SCIENCE.	15	0.39
WELDER.	2	0.05
AEROSPACE ENGINEER.	7	0.18
FIREFIGHTER.	21	0.55
KEYPUNCH OPERATOR.	3	0.08
LANDSCAPE ARCHITECT.	25	0.65
OPERATING ROOM TECHNICIAN.	10	0.26
OPTOMETRIST.	30	0.78
TEACHER, EARLY CHILDHOOD.	37	0.97
TEACHER, SPECIAL EDUCATION.	76	1.98
CONSTRUCTION INSPECTOR.	19	0.50
CORRECTION OFFICER.	13	0.34
GEOLOGIST.	25	0.65
HOSPITAL ADMINISTRATOR.	27	0.70
PHYSICIAN'S ASSISTANT.	34	0.89
STENOGRAPHER.	9	0.23
EEG TECHNOLOGIST.	0	0.00
NURSING ASSISTANT.	0	0.00
FLORIST (RETAIL & DESIGNER).	6	0.16
TEACHER, VOCATIONAL/TECHNICAL.	9	0.23
CHEF/COOK.	0	0.00
PLUMBER.	5	0.13
FOOD SCIENTIST/TECHNOLOGIST.	10	0.26
TELEVISION PRODUCER/DIRECTOR.	5	0.13
INTERPRETER/TRANSLATOR.	26	0.68
LEGAL ASSISTANT.	39	1.02
FARMER/FARM MANAGER.	11	0.29

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[a] Frequency indicates the total number of times an occupation was selected as a subject for inquiry by novices and initiates.

Table P18

QUESTIONS IN COMPARE (N= 9307[a])	FREQ	%
DEFINITION OF OCCUPATION?	643	6.91
DESCRIPTION OF WORK ACTIVITIES?	701	7.53
LEVELS OF SKILLS?	375	4.03
WHERE TO GET MORE INFORMATION?	294	3.16
EDUCATION REQUIRED-EARLY ENTRY?	608	6.53
SPECIFIC OCCUPATIONAL TRAINING?	376	4.04
RELATED COLLEGE COURSES?	377	4.05
PERSONAL QUALIFICATIONS?	460	4.94
OTHER REQUIREMENTS?	231	2.43
BEGINNING SALARY?	532	5.72
AVERAGE INCOME-HIGH INCOME?	456	4.90
TOP SALARY POSSIBILITIES?	280	3.01
HOW SALARIES VARY?	195	2.10
OPPORTUNITIES TO HELP OTHERS?	177	1.90
OPPORTUNITIES FOR LEADERSHIP?	118	1.27
WHAT FIELDS OF INTEREST?	339	3.64
PRESTIGE LEVEL?	119	1.28
SPECIAL PROBLEMS?	319	3.43
PHYSICAL SURROUNDINGS?	178	1.91
LEISURE-HOURS?	300	3.22
INDEPENDENCE ON THE JOB?	207	2.22
VARIETY?	227	2.44
FRINGE BENEFITS?	211	2.27
EMPLOYMENT OUTLOOK?	518	5.57
WHERE ARE THE JOBS?	407	4.37
JOB SECURITY?	249	2.68
ADVANCEMENT?	219	2.35
HOW MANY WOMEN?	191	2.05

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[a] Frequency is the total number of times the question was chosen by novices and initiates.

Table P19

Students' Reports of Their Previous Academic Performance

H.S. RANK (N= 132)	FREQ	%
TOP FIFTH.	22	16.67
2ND FIFTH.	42	31.82
3RD FIFTH.	50	37.88
4TH FIFTH.	17	12.88
BOTTOM FIFTH.	1	0.76

H.S.MATH GRADES (N= 132)	FREQ	%
MOSTLY A'S.	25	18.94
MOSTLY B'S.	51	38.64
MOSTLY C'S.	45	34.09
BELOW C.	11	8.33

H.S.ENGLISH GRADES (N= 132)	FREQ	%
MOSTLY A'S.	39	29.55
MOSTLY B'S.	57	43.18
MOSTLY C'S.	33	25.00
BELOW C.	3	2.27

HELP WITH ENGLISH (N= 132)	FREQ	%
YES.	43	32.58
NO.	65	49.24
NOT SURE.	24	18.18

Table P20

Programs Chosen in Prediction (N = 480[a])

	FREQ	%
Accounting	23	4.79
Administration of Justice	11	2.29
Afro-American Studies	2	0.42
Anthropology	4	0.83
Architecture	12	2.50
Art	7	1.46
Aviation Commercial Pilot	5	1.04
Business Administration	33	6.88
Business Education	1	0.21
Chemistry	2	0.42
Chicano Studies	1	0.21
Child Development	11	2.29
Chiropractic	0	0.00
Computer Science	6	1.25
Dental Assistant	2	0.42
Dental Hygiene - 2 yr.	1	0.21
Dental Hygiene - 4 yr.	1	0.21
Dentistry	1	0.21
Early Child Teaching Assistant	8	1.67
Economics	9	1.88
Electronics	4	0.83
Engineering	6	1.25
English	18	3.75
Ethnic Studies	4	0.83
Fashion Coordinator	2	0.42
Foreign Languages	11	2.29
Forestry	13	2.71
Forestry Technology	7	1.46
Geography	1	0.21
Geology & Geophysics	3	0.63
Home Economics	4	0.83
Industrial Arts Teacher	2	0.42
Industrial Supervision	3	0.63
Interior Design	8	1.67
Journalism	4	0.83
Journalism - 4 yr.	9	1.88
Law	30	6.25
Librarianship	5	1.04
Math/Astronomy	11	2.29
Medical Technology	6	1.25
Medicine	12	2.50
Nursing - RN	6	1.25
Nursing - Transfer	4	0.83
Occupational Therapy	10	2.08
Oceanography	4	0.83
Optometry	2	0.42
Pharmacy	5	1.04

Table P20 (continued)

	FREQ	%
Philosophy	3	0.63
Physical Education	6	1.25
Physical Therapy	10	2.08
Physics	2	0.42
Podiatry	2	0.42
Police Science	10	2.08
Product Design	4	0.83
Psychology	25	5.21
Radio & TV Broadcasting	5	1.04
Religious Studies	7	1.46
Secretarial	4	0.83
Secretarial Administration	4	0.83
Secretary-Legal	4	0.83
Social Science	6	1.25
Sociology	13	2.71
Speech Pathology	6	1.25
Stewardess	5	1.04
Teaching-Elementary	8	1.67
Telcom-Controls	4	0.83
Telcom-Production	7	1.40
Veterinary Medicine	11	2.29

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[a] The _n_ represents the sum of the individual frequencies, not students.

Table P21

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QUESTIONS IN PREDICTIONS (N= 109 )          FREQ                 %
                                            ----                 -
   CHANCES IN 100 MEAN?                      20               18.35
   CHANCES OF PASSING COURSE?                21               19.27
   HOW TO PREDICT GRADE.                     22               20.18
   CHANCES GOOD OR BAD.                      21               19.27
   SIGI RIGHT OR AM I RIGHT?                 25               22.94
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Table P22

1ST CHOICE OCCUPATION IN STRATEGY-PRE[a] & POST[b] (N= 493 & 451)

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	6	1.22	5	1.11
ADVERTISING COPYWRITER.	4	0.81	1	0.22
AIR COND, REFRIG, & HEAT MECH.	1	0.20	1	0.22
ACCOUNTANT.	21	4.26	16	3.55
AIRCRAFT MECHANIC.	0	0.00	0	0.00
APPLIANCE REPAIR TECHNICIAN.	0	0.00	0	0.00
ARCHITECT.	5	1.01	2	0.44
AUTOMOBILE SALESWORKER.	0	0.00	0	0.00
ARCH. TECH. AND DRAFTSMAN.	0	0.00	0	0.00
AVIONICS TECHNICIAN.	0	0.00	1	0.22
AUTOMOBILE MECHANIC.	4	0.81	7	1.55
ACTUARY.	2	0.41	1	0.22
BROADCAST TECHNICIAN.	1	0.20	1	0.22
BEAUTICIAN.	0	0.00	0	0.00
BOTANIST.	4	0.81	2	0.44
BOOKKEEPER.	2	0.41	2	0.44
BUSINESS MACHINE REPAIR TECH.	0	0.00	0	0.00
BANK OFFICER.	5	1.01	4	0.89
BANK TELLER.	2	0.41	1	0.22
COMMERCIAL ARTIST.	4	0.81	1	0.22
CLOTHING DESIGNER.	1	0.20	1	0.22
CHEMICAL ENGINEER.	0	0.00	1	0.22
CHEMIST.	2	0.41	0	0.00
CLERGY.	6	1.22	4	0.89
COMPUTER OPERATOR.	1	0.20	0	0.00
COMPUTER PROGRAMMER.	4	0.81	2	0.44
CIVIL ENGINEER.	7	1.42	10	2.22
DENTAL ASSISTANT	1	0.20	1	0.22
DENTIST	5	1.01	8	1.77
DENTAL HYGIENIST	2	0.41	0	0.00
DRAFTSMAN	2	0.41	1	0.22
DIETITIAN	3	0.61	1	0.22
DIESEL MECHANIC	3	0.61	1	0.22
DANCER AND DANCING TEACHER	1	0.20	0	0.00
ECONOMIST	1	0.20	2	0.44
ELECTRICAL ENGINEER	6	1.22	3	0.67
ENGINEERING TECHNICIAN	0	0.00	0	0.00
ELECTRONICS TECHNICIAN	3	0.61	2	0.44
FINE ARTIST/PRIVATE ART TEACHER	5	1.01	6	1.33
FUNERAL DIRECTOR	2	0.41	2	0.44
FLIGHT ENGINEER	2	0.41	1	0.22
FLIGHT ATTENDANT	7	1.42	3	0.67
FORESTER	7	1.42	8	1.77
GEOGRAPHER	1	0.20	1	0.22
HOME ECONOMIST	1	0.20	2	0.44
HOTEL/MOTEL MANAGER	5	1.01	5	1.11
INSURANCE AGENT	0	0.00	1	0.22
INTERIOR DESIGNER/DECORATOR	9	1.33	4	0.89
INDUSTRIAL ENGINEER	6	1.22	7	1.55
INDUSTRIAL TRAFFIC MANAGER	1	0.20	1	0.22
INDUSTRIAL DESIGNER	2	0.41	2	0.44
INSTRUMENT REPAIR TECHNICIAN	0	0.00	0	0.00
SCIENCE LAB TECHNICIAN	0	0.00	0	0.00

Table P22 (continued)

LIBRARIAN	5	1.01	4	0.89
LABOR RELATIONS SPECIALIST	4	0.81	5	1.11
LIBRARY TECHNICIAN	0	0.00	0	0.00
LAWYER	24	4.87	25	5.54
MATHEMATICIAN	0	0.00	0	0.00
PHYSICIAN	8	1.62	9	2.00
MECHANICAL ENGINEER	4	0.81	2	0.44
METEOROLOGIST	2	0.41	0	0.00
MEDICAL RECORD ADMINISTRATOR	1	0.20	1	0.22
MEDICAL LAB TECHNICIAN	1	0.20	3	0.67
MODEL	1	0.20	0	0.00
MARKET RESEARCHER	1	0.20	1	0.22
MANUFACTURER'S SALESWORKER.	2	0.41	2	0.44
MEDICAL TECHNOLOGIST.	1	0.20	0	0.00
MUSICIAN/MUSIC TEACHER.	6	1.22	5	1.11
MACHINIST.	0	0.00	0	0.00
NURSERYMAN/LANDSCAPER.	4	0.81	2	0.44
NEWSPAPER REPORTER.	2	0.41	3	0.67
OCEANOGRAPHER.	4	0.81	3	0.67
OPTICIAN.	0	0.00	0	0.00
OCCUPATIONAL THERAPIST.	7	1.42	7	1.55
PURCHASING AGENT.	1	0.20	1	0.22
POLICE OFFICER.	7	1.42	5	1.11
PUBLIC HEALTH SPECIALIST.	1	0.20	3	0.67
PILOT.	4	0.81	5	1.11
POLITICAL SCIENTIST.	6	1.22	6	1.33
PHARMACIST.	1	0.20	0	0.00
NURSE, PRACTICAL.	1	0.20	0	0.00
PHOTOGRAPHER.	5	1.01	4	0.89
PUBLIC RELATIONS WORKER.	4	0.81	2	0.44
PHYSICIST.	1	0.20	1	0.22
PHYSICAL THERAPIST.	6	1.22	4	0.89
PERSONNEL INTERVIEWER.	3	0.61	5	1.11
PRODUCTION MANAGER.	2	0.41	4	0.89
PSYCHOLOGIST.	44	8.92	32	7.10
RADIO/TV ANNOUNCER.	4	0.81	3	0.67
REHABILITATION COUNSELOR.	13	2.64	18	3.99
RECEPTIONIST.	2	0.41	3	0.67
REAL ESTATE AGENT	2	0.41	2	0.44
NURSE, REGISTERED.	6	1.22	1	0.22
RESPIRATORY THERAPIST.	1	0.20	3	0.67
RETAIL STORE MANAGER.	2	0.41	3	0.67
RADIO/TV SERVICE TECHNICIAN.	0	0.00	0	0.00
RECREATION WORKER.	3	0.61	1	0.22
SYSTEMS ANALYST	1	0.20	2	0.44
SOIL CONSERVATIONIST.	3	0.61	3	0.67
SECURITIES BROKER.	5	1.01	5	1.11
SECRETARY.	3	0.61	3	0.67
SCHOOL COUNSELOR.	18	3.65	20	4.43
STATISTICIAN.	3	0.61	2	0.44
SOCIAL SERVICE AIDE.	4	0.81	4	0.89
SPEECH PATHOLOGIST/AUDIOLOGIST.	2	0.41	7	1.55
SINGER AND SINGING TEACHER.	0	0.00	0	0.00
SURVEYOR.	0	0.00	1	0.22
SOCIAL WORKER.	7	1.42	6	1.33
TEACHER AIDE.	2	0.41	1	0.22
TELEPHONE CRAFTSWORKER.	0	0.00	0	0.00
TOOL AND DIE MAKER.	0	0.00	0	0.00
TEACHER, ELEMENTARY SCHOOL	12	2.43	8	1.77
ZOOLOGIST.	2	0.41	1	0.22

Table P22 (continued)

TECHNICAL WRITER.	0	0.00	0	0.00
TYPIST.	0	0.00	0	0.00
URBAN PLANNER.	1	0.20	2	0.44
VETERINARIAN.	3	0.61	3	0.67
WASTEWATER TREATMENT OPERATOR.	0	0.00	0	0.00
X-RAY TECHNOLOGIST.	4	0.81	3	0.67
TEACHER, ART.	1	0.20	2	0.44
TEACHER, BIOLOGY.	1	0.20	1	0.22
TEACHER, BUSINESS.	2	0.41	2	0.44
TEACHER, ENGLISH/LANG. ARTS.	3	0.61	4	0.89
TEACHER, FOREIGN LANGUAGE.	2	0.41	4	0.89
TEACHER, HISTORY/SOCIAL STUDIES.	2	0.41	2	0.44
TEACHER, INDUS. ARTS/VOC.TECH.	2	0.41	4	0.89
TEACHER, MATHEMATICS.	2	0.41	0	0.00
TEACHER, PHYSICAL EDUCATION.	13	2.64	15	3.33
TEACHER, PHYSICAL SCIENCE.	0	0.00	2	0.44
WELDER.	0	0.00	0	0.00
AEROSPACE ENGINEER.	0	0.00	0	0.00
FIREFIGHTER.	5	1.01	3	0.67
KEYPUNCH OPERATOR.	0	0.00	0	0.00
LANDSCAPE ARCHITECT.	2	0.41	4	0.89
OPERATING ROOM TECHNICIAN.	2	0.41	2	0.44
OPTOMETRIST.	3	0.61	2	0.44
TEACHER, EARLY CHILDHOOD.	8	1.62	5	1.11
TEACHER, SPECIAL EDUCATION.	8	1.62	10	2.22
CONSTRUCTION INSPECTOR.	0	0.00	0	0.00
CORRECTION OFFICER.	2	0.41	2	0.44
GEOLOGIST.	1	0.20	2	0.44
HOSPITAL ADMINISTRATOR.	4	0.81	3	0.67
PHYSICIAN'S ASSISTANT.	3	0.61	4	0.89
STENOGRAPHER.	1	0.20	1	0.22
EEG TECHNOLOGIST.	0	0.00	0	0.00
NURSING ASSISTANT.	0	0.00	0	0.00
FLORIST (RETAIL & DESIGNER).	0	0.00	0	0.00
TEACHER, VOCATIONAL/TECHNICAL.	0	0.00	0	0.00
CHEF/COOK.	0	0.00	0	0.00
PLUMBER.	0	0.00	1	0.22
FOOD SCIENTIST/TECHNOLOGIST.	1	0.20	1	0.22
TELEVISION PRODUCER/DIRECTOR.	2	0.41	1	0.22
INTERPRETER/TRANSLATOR.	4	0.81	2	0.44
LEGAL ASSISTANT.	0	0.00	1	0.22
FARMER/FARM MANAGER.	2	0.41	2	0.44

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[a] "Pre" (first two columns) means first choice before the student received information about the rewards and risks associated with the occupation.

[b] "Post" (third and fourth columns) means first choice after receiving information about rewards and risks.

Table P23

Designation of First-Choice Occupations in Strategy with Respect to Desirability Sums and Estimated Chances for Entry

DESIRABILITY OUTCOME (N = 482)	FREQ	%
OCCUPATION WITH THE HIGHEST SUM.	195	40.46
WITHIN 10 POINTS OF THE HIGHEST.	101	20.95
MORE THAN 10 POINTS BELOW HIGHEST.	186	38.59
WHICH STRATEGY (N = 455)	**FREQ**	**%**
SUM HIGH;[a] CHANCES HIGH.	177	38.90
SUM HIGH;[a] CHANCES LOW.[b]	123	27.03
SUM LOW;[c] CHANCES HIGH.	81	17.80
SUM LOW;[c] CHANCES LOW.[b]	29	6.37
SUM HIGH; CHANCES EQUAL.	32	7.03
SUM LOW:[c] CHANCES EQUAL.	13	2.86

[a] Sum High means that the occupation had the highest Desirability Sum or came within 10 points of the highest sum.

[b] Chances Low means "chances not high"; i.e., the student estimated better chances for some other occupation in the set of three. Low does not necessarily mean lowest.

[c] Sum Low means that the Desirability Sum was not the highest or within 10 points of the highest. It does not mean that the Desirability Sum was necessarily the lowest of the three sums under consideration.

CHAPTER VII

FINDINGS AT SANTA FE COMMUNITY COLLEGE

Description of College, Computer Configuration, and Career Counseling Services

Santa Fe Community College (SFCC), situated in Gainesville, Florida, has an enrollment of approximately 4,300 full-time and 1,600 part-time students.

Computer Configuration

In January 1976, when the evaluation team visited Santa Fe, four terminals were in use. All four terminals were installed with the software in March 1975. After the site visit, a remote terminal was installed at Bradford County High School, which serves as a satellite campus for the college. This enables both high school students and Santa Fe students to use the SIGI system.

The four local SIGI terminals are in one room of the SIGI Career Counseling Center, a temporary building adjacent to the main administration building, where users have privacy and few distractions. This building also houses a career library and the Office of Financial Aid.

Santa Fe runs SIGI on a PDP-11/40 based RSTS/E system which has 64K of core memory and four RK05 1.2-million-byte cartridge disk drives. The computer is located less than 40 feet from the local terminals in an adjacent room of the counseling center. These terminals are directly connected to the computer. Three of them are equipped with Texas Instrument 30-character-per-second printers and one has an Okidata 120-character-per-second printer. The remote terminal at the high school is connected to the computer by a leased line using Bell 202 modems at 180 characters per second. This terminal is also equipped with a 30-character-per-second Texas Instrument printer. All of the terminals are connected to the computer through DL11 single line interfaces.

The RSTS system is operated by a psychology graduate student with a strong interest in computer science. He has other responsibilities at the college besides the operation of the computer. Several additional applications are being planned for Santa Fe's computer, including an interactive scheduling and inventory system for audio-visual equipment.

How reliable is this hardware configuration? To find out, we asked the test sites to keep two logs from September 1 to December 1, 1976, one by the computer operators and the other by the SIGI monitors, describing each hardware problem and, if possible, identifying its source. The logs of the computer operators were sent to ETS every time there was a problem; the logs of the SIGI monitors were collected at the end of the test period.

During the time the logs were kept there were no problems beyond what might be expected in any computer system the size of SIGI. All the components are standard, off-the-shelf equipment requiring no modification for SIGI. Problems were taken care of by means of routine service procedures.

During the start-up period, Santa Fe had a reasonable number of hardware problems. In the first five months of operation they found that DEC field service was "prompt and efficient" and that the mainframe was "quite reliable." There were some problems with the reliability of the Delta Data 5000 terminals and service available through a third party (GTE). These problems were resolved with the installation of heavier power supply units, and the system has been operating smoothly ever since.

Career Counseling Services

Description of counseling department. Santa Fe has 15 full-time counselors who handle career, educational, financial, academic, and personal counseling, as well as guidance assessment and placement. Eleven paraprofessional counselors specialize in either academic advisement or financial aid counseling.

In January 1976 a member of the ETS SIGI staff conducted a seminar for counselors. He made a presentation about SIGI and career counseling, and answered counselors' questions.

Role of SIGI in counseling program. Twelve counselors teach a three-hour behavioral science elective called, "The Individual in a Changing Environment" (BE 100), which focuses on interpersonal effectiveness as well as on career exploration. Six of them have incorporated SIGI into the course as a kind of laboratory unit. Students in their sections receive an orientation to each subsystem of SIGI and a follow-up in class. Each section of the course is different, but in general, counselors anticipate questions and problem areas and encourage students to share their SIGI printouts, write a paper setting forth their career goals, use other career exploration instruments, and/or participate in exercises in values clarification. Terminal time is scheduled for class members to use SIGI independently during three separate appointments.

SIGI has been incorporated into Santa Fe's counseling program in another important way. For each SIGI occupation, an index sheet is being compiled listing all of the resources at the college related to the occupation. These resources include video cassettes, written materials (both fiction and nonfiction) in the career library and main library, staff members with experience in the field, and so on. The index sheets are filed by SIGI occupation number so that students who have used the system are able to locate occupational information easily, and those who have not learn that occupations which interest them are included in SIGI.

The Dean of Student Development oversees the SIGI program at Santa Fe. An administrative assistant, herself a Santa Fe graduate, is responsible for the day-to-day operation of the counseling center. This person also handles the public relations aspects of SIGI--visiting classrooms to tell students about SIGI and meeting interested visitors. She is also in charge of the career library and is responsible for maintaining contact with counselors and instructors concerning SIGI and the career library. With the help of another assistant, she prepared Santa Fe's planning and prediction material. A secretary and a student assistant handle scheduling and records of SIGI users. They also assist students who have problems using SIGI.

SIGI is available to students from 8:00 a.m. to 10:00 p.m., Monday through Thursday, and from 8:00 a.m. to 4:30 p.m. on Friday. Because the college has had four local terminals from the beginning, no scheduling problems have arisen. Approximately 60 students use SIGI each week.

The college publicized the presence of SIGI in many ways, including posters and a film strip. Students also learned about SIGI by word of mouth or were referred to SIGI through the BE100 course, counselors, or faculty. Students in BE100 courses had priority in using SIGI; other students signed up on a first-come, first-served basis.

No special tests were administered at Santa Fe in connection with SIGI, although the college does use assessment tests for incoming freshmen. The college administers its own pre- & post-questionnaires to SIGI students.

Students who used SIGI were not required to see a counselor when they finished, but as they left SIGI they were offered the chance to do so. Most students felt no need for a post-SIGI counseling session, either because they were enrolled in BE 100 and could discuss SIGI in class, or because they preferred to use SIGI on their own without the aid of a counselor.

Impact on Students

To measure the impact of SIGI on its users, we interviewed a few students who had gone through SIGI at each college, and we had questionnaires administered to a sample of SIGI users (experimentals) and a sample of students who were interested in using SIGI but had not started (controls). The colleges themselves selected the students to be interviewed and administered the questionnaires in accordance with out guidelines. (See Appendix D, letter to the college.) This section of this chapter discusses our findings from the interviews and questionnaires at Santa Fe Community College.

Interviews

The college selected at random 16 persons to be interviewed, all of whom had gone through SIGI. Lack of space makes it impossible to report all these interviews in detail. Instead, we will use one student, Mike, as a vehicle for showing the impact of SIGI on an individual forced by circumstances to cancel all his career plans and to start over from the beginning; then we will generalize what we learned from the other interviews.

Mike. Mike was 22 years old and had just begun taking courses at Santa Fe when we interviewed him. He had gone through SIGI shortly before his admission into the college.

For many years he had wanted to be a plumber and had started working for a plumbing contractor soon after graduating from high school. He liked the job from the first and was more resolved than ever to become a plumber himself. Three years later the time seemed right to begin an apprenticeship program.

Then, just a few months before he was to become an apprentice, he was injured in an automobile accident. His legs were badly damaged, and his doctors told him that he might never regain the ability to do strenuous work. His dreams were shattered; becoming a plumber was now out of the question. Instead of being a person who, as he put it, "pretty well had it made in the shade," he found himself completely at sea and severely handicapped as well.

Fortunately, money was not a problem. His injury was job-related, and he was eligible for workman's compensation; he might even qualify for tuition assistance for retraining in a new field. The question for him was, What field? He heard about SIGI and decided to use it to get some ideas. He described his state of mind as follows:

> It was the thing of having to find another job, one that I could fit into, that would give me the type of things that I wanted. . . . It was something my mind had been closed to--other fields and occupations. . . . So I decided to come out here and play along with [SIGI] and see if it could throw some ideas out at me.

During his first session, Mike went through Values, Locate, and Compare. He played the Values Game; used his top-weighted values--Technological interest field, Security, High Income, Independence, and Variety --to retrieve a list of occupations; and then went to Compare to ask questions about them.

When he looked over his printouts that night, he recognized a problem. Most of the occupations he had explored would require as much physical energy and stamina as would plumbing. He was really no better off than before.

He thought for a long time about the meaning of the information he was getting from SIGI. He decided that the next time he used the system, he would specify the Administrative interest field instead of the Technological. This change might lead to occupations that he could be successful in despite his handicap.

He also thought about his values again in light of his physical limitations and his reactions to the information he had got from his first session. He said that since the accident, "I've had to change completely around. I've had to pick up new values, new ideas, new ways." Two of the "new values," besides the Administrative interest field, were High Income and Security. Both had become more important to him than they had been before the accident.

Upon returning to SIGI, Mike quickly went through Prediction, Planning, and Strategy in order to attain initiate status as rapidly as possible. He would then go through the entire system again more carefully.

This plan worked. He specified the Administrative interest field in Locate and retrieved a number of occupations that he had never thought of before. He told the interviewer, "One that came up that I'm taking into consideration now [is] accounting. It really interests me the most."

He followed Accountant through the SIGI subsystems and also read about it in books and pamphlets. His predictions for the accounting program at Santa Fe looked good to him. He also carefully studied displays from the Planning system to see which courses he should take. He kept his printouts to take to his counselor upon his admission as a student. In Strategy he found that Accountant had the highest Desirability Sum of the three occupations he was comparing. He also estimated favorable chances for successful entry.

Accountant did not flash into Mike's mind like a divine inspiration. Rather, it appeared unheralded and gained acceptance as the result of a rational process. The process began with an assessment of his values, then a reassessment in view of fresh knowledge. The process continued with the acquisition of information about the occupation, his own abilities, the plans he would have to make, and a comparison with other occupations. "At first I really wasn't quite happy with the idea of being an accountant," he said. "I was used to being out in the open, working with my hands, doing something constructive. . . . But it seems like it fits me well enough."

In the end he became convinced that Accountant would offer him high income and security, as well as the other satisfactions he was looking for. He said, "The more I look at accounting, the more it [seems] to fit me. . . . Really, I did not know about my values and all those things until I used SIGI."

Soon after finishing SIGI, Mike was admitted to Santa Fe. He enrolled in business administration with the aim of transferring to the University of Florida. He said that all parts of SIGI had been instrumental in his decision, but that the main benefit had been to instill in him an awareness of the many career opportunities open to him. "I think SIGI has a good variety of occupations for someone who doesn't have any ideas," he said. "It did for me."

Other interviews. The other 15 students who were interviewed at Santa Fe had varied experiences with SIGI. The following paragraphs are a summary of their reactions to the system and its impact on them.

The immediate impact of SIGI varied according to how well defined the students' expectations were when they began their interaction. If a student had some more or less definite occupational goal in mind, or if he was choosing between two or three occupations, or if he merely wanted information about dark areas of occupations he was considering, he usually found the answer he was seeking. The most obvious impact was immediate confirmation of a specific occupational goal: Often the student started with the idea of being an electrical engineer, an accountant, a funeral director, went through SIGI, and emerged with his goal confirmed but now more firmly based than it had been because of the knowledge he had gained. Sometimes the impact was in the form of disconfirmation. One student, whose parents were both physicians, assumed that in the normal course of events he would become a physician, too. The Prediction system caused him to reassess his situation; the prediction showed small chances of getting a good grade in the preparatory key course, and the statement that past performance is usually the best predictor of future performance had a strong influence on his thinking.

The immediate impact of SIGI was less apparent when the students' expectations were not so clearly defined. Students who had no occupational goals and who hoped that SIGI, by means of the magic that is the property of computers, would be able to tell them, "This is what you're supposed to do," did not always leave SIGI feeling that their problems had been solved. One student said, "When I went into SIGI, I expected it to give me more answers and not really rely on me to make so many decisions. I guess I was kind of waiting for it to tell me, 'Yes, this is the answer.' But it doesn't do that, even to the end."

The main impact of SIGI was not, however, to equip the students with occupational goals that they could forthwith begin pursuing. The main impact was in providing students with a new and logical mode of thinking. The interviewers saw evidences of this impact on all the sample students. The acquisition of this mode of thinking was almost unconscious. That is, students seldom said, "I found a new mode of thinking." They did, however, talk about their values and about discovering the use of values as a basis for decisions. One said, "I like the Values system. . . . I thought it was excellent, and I have never done anything like it in the occupational tests I have taken." Another said, "It was excellent, excellent. For the first time I think I realized what the most important things are to me. And it stuck. . . . I wrote them down immediately. . . . It helped to see it all right in front of me."

They also talked about entertaining new ideas. A young woman was entranced when Industrial Designer appeared for her in Locate. "I still don't understand why anyone at any time had never explained to me about the occupation Industrial Designer," she said. Another woman discovered Electrical Engineer and said, "I have a fantasy of going into electrical engineering [laugh]. . . . I'm interested in electricity and I like math." Similar comments were made by one student or another about every subsystem of SIGI or about SIGI as a whole.

The impact of SIGI was not always immediate. In fact, it usually took some time for the concepts planted by SIGI to grow. Of the three students who went through SIGI in one grinding session, two reacted negatively to trying to absorb so much in such a small amount of time. Other students said that SIGI had started them thinking in new directions about their careers, but that they had not yet made a decision. Most interestingly, seven of the students wanted to return to SIGI as initiates. One had used SIGI six months before and was using it again. She said, "I started going through it again recently because I didn't get the full advantage of it before." Another said, "If I ever change my major or ever have any ideas about changing my major, I think I'll go back and go through SIGI again."

A third commented on the value of letting the information dispensed by SIGI ferment for a while away from the computer. She said, "Later on, after you've lived with it a little while, you can come back and pick it up again and do some re-evaluation. This is valuable to me. . . . It's kind of like a private memory bank. . . . I can go back and have the information flashed back on the screen for me."

One additional facet of SIGI's impact should be mentioned here: SIGI was sufficiently flexible to respond to the different needs of most of these students. The most common need--often unrecognized--was for values clarification. These students were simply not in the habit of making their values explicit, and they were grateful for the opportunity to do so, even though some of them found it hard. But there were other needs, too. Students tended to linger in the subsystem that was satisfying a need and to hurry through the rest of SIGI. Thus we find one student concentrating on Locate, another on Compare, a third on Prediction, and so on. Although novices are forced to "read" SIGI from beginning to end, like a book, and they clearly seem to get from that experience a sense of orderly process in decision-making, the immediate impact of SIGI on many students lies in finding the answer to a need they feel at the moment. SIGI seems to function satisfactorily as an information system as well as a guidance program.

Experimental and Control Group Questionnaires

Method of analysis. Separate questionnaires were given to students who had been through SIGI (experimentals) and to students who were scheduled to use SIGI but who had not actually used it (controls). This section of the report covers the responses of SFCC students to the questionnaires. Since questions 1-41 are the same for experimentals and controls, we were able to run tests of significance comparing the responses of the two groups and to present the 41 questions, together with our findings, in a single table, S1. The portions of the questionnaires that are different are in separate tables: questions 42-45 for controls in Table S4 and questions 42-88 for experimentals in Table S5. (The intact questionnaires are in Appendix D.) In all cases the numbers in the tables are percentages unless otherwise indicated.

In the tests of significance, chi-squares were computed for most questions (1-24 and 37-41). In the computation, responses in logically related categories were grouped if the expected cell sizes fell below 5; this is a requirement for chi-square. For questions 25-29, in which students used scales to rate themselves on a variety of dimensions, *t*-tests were done on the computed group means. Questions 31-34 comprise an information test. Wrong answers for each question were scored 1 and correct answers 2. The four scores were then added and an information test score group mean was computed. It is shown opposite question 30 in Table S1. A *t*-test was then done on the two means. In reporting the results of all tests of significance, we follow the convention of using a single asterisk for significance at the .05 level and double asterisks for the .01 level.

Several of the questions are open-ended. Responses to these have been placed in separate tables. Tables S2 and S3 list the occupations named by experimental and control students in response to question 30 (What occupation would you like to prepare yourself for eventually?) The responses have been grouped according to whether or not the occupation named was among those already in SIGI. Other responses that could not be quantified appear in Tables S4A, S6, and S7.

Results. Questions 1-3 give a description of the sample in terms of age, sex, and college enrollment. The experimental and control groups do not differ significantly on these dimensions. In both groups, more than half of the students were women, some 63% of the experimentals and 70% of the controls were between 15 and 22 years old, and approximately half were freshmen.

Questions 4-10 concern students' assessment of their career decision-making skills. Significant differences were found in all seven questions: The experimental group (SIGI users) indicated greater knowledge of the rewards and satisfactions to be obtained from an occupation (question 4), had explored more occupations (question 5), knew of more occupations that would give them the satisfactions they wanted (question 6), had more definite and specific career plans (questions 7 and 9), and indicated more overall confidence in their career decision-making skills (question 10)--all $p < .01$. Moreover, the experimentals were more confident ($p < .05$) of their ability to predict grades (question 8).

Insert Table S1 about here

SIGI also seemed to stimulate activities related to career exploration (questions 11-18). Significant differences were found in responses to four of the questions: More experimentals had used the college career reference library (question 14), and, not unexpectedly, more had used "a computer-based guidance system" (question 18)--for both, $p < .01$. Also, more of the experimentals had often read about occupations (question 11) and were more likely to have used career-related audiovisual materials (question 17)--

$p < .05$. No significant differences were found in the extent to which the two groups talked with friends about careers (question 12), talked with people in the field (question 13), attended career planning workshops (question 15), or talked to a guidance counselor about careers (question 16).

Given the opportunity to agree or disagree with certain statements about choosing an occupation (questions 19-24), students who had used SIGI disagreed more strongly that chance would decide which occupation they would enter (question 20) and were less disturbed by conflicting advice from others (question 21)--for both, $p < .05$. No significant differences were found in the attitudes of the two groups toward following the advice of others, toward making their own decisions, toward the need to know marriage plans, or toward the need to make an immediate choice (questions 19, 22, 23, and 24).

Questions 25 through 29 explored the way students rated themselves as career decision-makers. For all of these questions significant differences were found between the responses of the two groups. At the .01 level of significance, SIGI users distributed themselves closer to the "good" end of the career decision-making scale than did nonusers (question 25), showed more confidence in their knowledge of occupations (question 26), planned ahead more often (question 27), and were more confident of their knowledge of goals and values (question 29). At the .05 level of significance they were more confident about their decisions, once made (question 28).

As a check on these self-ratings, four questions were included to test the students' actual knowledge of occupations (questions 30-34). Students were asked to name a first-choice occupation (question 30) and were questioned about the education required, average salary, amount of independence, and employment outlook for that occupation. Tables S2 and S3 list the occupations named by the two groups of Santa Fe students. They show that most of the occupations of interest to both groups are already offered by SIGI.

First-choice occupations named by 72 of the 86 students in the experimental group and by 70 of the 115 students in the control group were SIGI occupations. Eight experimentals and 17 controls named identifiable occupations not in SIGI. The rest--6 students in the experimental group and 28 in the control--were unable to name a specific occupation or were undecided.

Insert Tables S2 and S3 about here

The replies to question 30 were sometimes difficult to tabulate because students often were unable to identify a specific occupation or to express clearly what they had in mind. We sometimes had to make judgments about a student's meaning. When the staff could not reach agreement, they recorded the answer as Too Vague to Classify. When the occupation named in question 30 was a SIGI occupation, we were in a position to evaluate the accuracy of the students' responses to questions 31-34 for both groups. These four questions constitute an information test, which was scored in the manner described earlier. No significant difference was found between the two groups. The experimentals, however, got a higher proportion of correct answers on all questions except number 34, which concerned future employment prospects in the occupation.

Responses to questions 37-41 show that the two groups were similar in their career guidance experiences (excluding SIGI) at Santa Fe. Approximately 60% of both groups had seen a counselor within the last two months (question 37) about a variety of problems (question 38), but more than 75% had not taken a career guidance course (question 39). Of those who had taken a career guidance course, differences in expressed satisfaction were not significant (question 40). Over two thirds (70% of the experimentals, and 66% of the controls) had a favorable attitude toward interacting with a computer for career guidance (question 41).

The remaining four questions in the questionnaire for the control group explored attitudes toward SIGI. They are listed in Table S4. Ninety-seven percent of the group had heard of SIGI (question 42) and 99% wanted to use it (question 45). No one had formed an unfavorable impression of it (question 43). Members of the group had learned about it from a variety of sources (question 44).

Table S4A lists the responses of the control group to the open-ended questions.

Insert Tables S4 and S4A about here

The remaining 46 questions in the questionnaire for the experimental group sought to find out how these SIGI users rated their experience with SIGI (Table S5).

When asked to give SIGI a grade (questions 42-54), more than 75% of the students graded SIGI A or B for nine of the 13 items (interest, clarity, overall usefulness, helping with values awareness, seeing relationships between values and career decisions, finding occupations to fit values, getting information, helping to plan appropriate programs, and learning to make career decisions). For the other four questions, which concern choice of an occupation, understanding predictions, estimating probabilities of success, and giving information about a program of study at Santa Fe, the proportion of A's and B's was over 65%.

Insert Table S5 about here

As for their experience with SIGI (question 55), 45% said that SIGI helped confirm a choice they had already made, 14% said that SIGI helped them to choose an occupation, and 37% thought that SIGI had suggested other occupations worth considering. Only 3% failed to perceive SIGI as having been directly helpful.

Questions 56-63 asked the experimental students whether they would consult SIGI, a counselor, or a combination of the two for help with occupational and educational decisions. The students would tend to choose the combination for most guidance purposes. This preference held true for planning a program of study, getting information about occupations, confirming an occupational choice, finding occupations that fit values, finding out about financial aid, resolving conflicts about occupational choice, and estimating chances of success in a program. SIGI alone was preferred for making values more clear.

Of the students who had used SIGI, 41% planned to schedule a conference with a counselor (question 64) for a variety of purposes (question 65). The responses to "Other" appear in Table S6.

Most of the students (77%) said that the occupations in which they were interested were actually retrieved on the basis of their values in Locate (question 66). Although they named some occupations as "missing" from SIGI (Table S6, question 67), the "occupations" they named were often not occupations at all, but general fields of interest; some were already in SIGI; some were specialties of occupations in SIGI; and some were occupations with only small numbers of workers. A few students mentioned occupations that are scheduled to be added to SIGI in the next round of additions (astronomer, CIA or FBI agent, travel agent). About 76% regarded the information in SIGI as superior to other sources of occupational information (question 68).

Insert Table S6 about here

Of the Santa Fe students who had used SIGI, 87% were satisfied with the 28 questions made available in Compare (question 69). Only a few made suggestions for additions. The questions suggested for addition are recorded in Table S6, question 69.

About 92% of the students found SIGI's style and vocabulary to be "just right," and none said that it was too difficult (question 70). Since the reading level of the text was designed for community college students, this finding is particularly encouraging.

Few students detected any sexual or racial bias in SIGI (question 71). The examples given by students who did feel there was bias appear in Table S6.

Seventy-two responses were made to question 72, asking about problems that might have occurred in using a computer-based system. Eighteen percent reported that the writing on the screen caused eyestrain; 17% thought there was too much reading; 14% did not understand some of the directions; 11% experienced computer malfunctions; 10% had wanted to sign off but couldn't. Only 3% said that they felt rushed while using SIGI. A number of other irritations were mentioned by the 19% of the students who checked "Other," such as getting unwanted printouts, slow printouts, or inability to go back to correct mistakes (Table S6, question 72).

Almost three-fourths of the SIGI users frequently took advantage of the opportunity to get printouts (question 73). Nearly two-thirds (65%) tried to get more information on their own initiative after using SIGI (questions 74 and 75). The majority (55%) of the students spent between two and four hours on SIGI, and 34% spent more (question 76). Nearly all those in the sample (99%) went all the way through SIGI, including Strategy, at least once, usually in two or more sessions (questions 77 and 78). More than half (61%) expressed an interest in securing additional time on SIGI (questions 79 and 80).

The six subsystems of SIGI seemed to meet a variety of different needs; every section would be "used most" by at least some students, although Planning and Compare received the largest percentages of votes (19% and 26%, respectively). Strategy was the system named least often (question 81).

Students found SIGI to be comprehensive; 91% said that there was nothing more they would like it to cover (question 82). A few wrote in suggestions for improvement, such as combining majors, more questions in Prediction, more information on where jobs are available, a list of counselors at the college, and so on (Table S6, question 82). Exactly three-fourths said that there was no area that needed fuller coverage (question 83), but others suggested more material on course requirements in Prediction and Planning; more in Values and Locate; more on agricultural fields, job descriptions, duties; and similar additions (Table S6, question 83). All areas were liked best by some students (question 84); finding occupations that fit values was the most popular, designated best by 26% of the group; learning about values (21%) and getting occupational information (20%) followed. The privacy that SIGI makes possible was considered very important by 24% of the group, but it made no difference to another 21% (question 85). Sixty-eight percent of the group said that they had advised their college classmates to use SIGI; of these, 71% had recommended it to three or more friends (questions 86 and 87).

Question 88 asked the students for suggestions for improving SIGI. The answers are listed in Table S7. Some of the suggestions were for expansion of the information or services offered by SIGI or for minor changes to enable students to move more quickly to the sections in which they were most interested. There were a few suggestions that revealed insufficient information on the part of the student. The general tone, however, was one of approval and gratitude.

Insert Table S7 about here

Impact on Counseling

Responses of seven Santa Fe Community College counselors who filled out questionnaires are tabulated in Table S8. (The constructed responses to the open-ended questions on that instrument are in Table S9.) Only two of the counselors reported that they had attended a SIGI workshop.

With or without a workshop, however, the counselors were in general favorably disposed toward the idea of computer-based guidance (questions 4-8). None saw computer-based guidance as a potential threat (question 6), five planned to use such a system in their counseling (question 7), and all seven had actually referred students to SIGI (question 12). The counselors thought that students who used SIGI reacted favorably to it (question 13) and benefited in a number of ways (question 28). They thought, by a six-to-one margin, that the reading level of SIGI was appropriate for their students (question 32), that the occupational information was better than other sources available (question 33), and that SIGI was free from any kind of bias (question 34). Interpretation of the students' printouts was not generally a problem (question 14). One counselor observed that persons experienced in the use of SIGI were needed to help in the interpretation of data, and another said that some students were incapable of succeeding in certain majors--a problem that is only remotely related to printouts (see Table S9). Only one counselor knew whether students had encountered problems with the terminals (question 15), since malfunctions of hardware were not handled by counselors (Table S9).

Questions 16-23 were designed to explore the effect SIGI might have on problems that counselors face in career guidance. The chief problems were getting students to read occupational information, keeping up to date with occupational information, and finding time to see all students who need help; the most frequently specified minor problem was identifying sources of occupational information, but at least two counselors thought all six items were minor problems. SIGI was seen to have had the greatest impact on keeping up to date (six responses) and getting students to read occupational information (four responses). Each problem was designated by at least two of the counselors as having felt the impact of SIGI. One noted that career counseling had been minimal (Table S9, question 22) and that SIGI had had an impact on that problem, too.

Insert Table S8 about here

Five counselors responded to questions 24-27, which explore the impact that SIGI may have exerted on counseling sessions. Four out of the five observed no change in the number of students they were able to see, the amount of time they spent in career counseling, or the length of their counseling sessions. On the other hand, three thought that SIGI had improved the quality of their discussions about values and career decisions, and two saw no change in quality.

Question 28 sought to discover how SIGI had affected students' career decision-making behaviors that might be observed in counseling sessions. Four counselors said they knew which of their students had used SIGI, but only three specified the differences in behavior they had noted. At least two out of the three rated SIGI users higher in the first five behaviors; one thought SIGI users were better able to select programs of study, whereas two were not in a position to observe; one thought the SIGI users were NOT better predictors of academic performance, and again the other two had not been able to observe this behavior.

Question 29 explored the subject of how SIGI should be fitted into the structure of the counseling department. Four counselors accepted the idea of making SIGI available to students on an entirely ad lib basis with no counselor intervention or mandatory follow-up. All the other responses favored a structure in which the counselor would play a direct role in the career guidance process. Use of SIGI as part of a formal classroom unit in career counseling was the structure named most frequently--five times. One counselor suggested placing a terminal in a feeder high school, and another wanted to use SIGI for self-evaluation and assessment as well as guidance (See Table S9).

Counselors named only three occupations or occupational areas that they or their students would have liked to see in SIGI (questions 30 and 31). One counselor suggested an improvement for SIGI in the form of more explanation of results (question 35), and two volunteered optional information. Their comments and the suggested occupations are listed in Table S9.

Insert Table S9 about here

Usage of the System

The computer automatically records the responses that students make to most displays. Tables S10-S23 represent these summary data on students who used SIGI at Santa Fe Community College from late August through early November 1976. The n's vary from table to table, with higher frequencies in Values, Locate, and Compare, which novices encounter first, and lower frequencies in Prediction and Strategy, which novices encounter last. The reasons for the decrease cannot be isolated. The main reason, however, appears to be that Santa Fe has made SIGI available to large numbers of visitors and students from other colleges who are able to use the system for only a short time and never finish, thus increasing the amount of use at the front end, especially Values and Locate. In any case, the reader should bear in mind that the summary data do not indicate the progress through SIGI of a particular group of students. They are merely a record of responses over a period of time. Some of the students were already in Planning or Strategy when the data collection began, and others were just beginning when the disk was swept clean of the accumulated data. Thus the tables are to some extent independent of one another. Nevertheless, the n's are sufficiently large to reflect the way SIGI was used.

Data from the SIGI Introductory Sequence

Breakdown of the sample. Table S10 shows the breakdown of this sample by age, sex, and enrollment status. Percentages are given rather than actual numbers because students are asked about their age and enrollment status every time they sign on, since these variables may have changed between sessions.

We see that over a quarter (27.5%) of "sign ons" were what might be called "older students," a finding that one might expect at a community college. The sample contained more women than men, but the dispropor-

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Insert Table S10 about here

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tion should not affect any of the data that follow, since SIGI is not programmed to differentiate between users by sex. Only about 10% of the sample had had no college experience.

Initial status with respect to career decisions. On their first pass through the introductory sequence, students respond to questions about their awareness of their occupational values, about their identification of occupations that fit their values, about their ability to predict their grades, and about their knowledge of appropriate programs to enroll in. Table S11 gives the distribution of their responses to these questions. The table reflects the state of mind of students as they begin their interaction with SIGI. We may make the following observations:

Insert Table S11 about here

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1. Over a quarter of the students in the sample said they knew their values, and about half of them had a general idea of what they want from an occupation but had not analyzed their values ("Value Status").

2. They tended to feel a need for much information about which occupations fit their values.

3. They believed that they could predict their grades successfully

in at least some programs.

4. Only 17% of them definitely knew what program to enroll in.

Data from the Values System

The Values system yields measures showing the importance that students attach to each of the ten occupational values used in SIGI and also indicates the field of interest they would like to work in.

Values weights. Table S12 shows the means and standard deviations of the weights that students assigned to the values on a scale where 0 designates no importance and 8 maximum importance. The figures in the "Unrestricted" column are the weights assigned by students before they played the Values Game--i.e., the numbers represent the students' initial reactions to the definitions of the values. The "Restricted" column reflects the effects of both the Values Game and the constraint that the sum of the weights equal 40. The latter condition, of course, largely accounts for the smaller means in the Restricted column. It is not possible to separate the effects of the Values Game and the restriction to 40 points on all changes from the Unrestricted to the Restricted columns. In general, however, it would not be unreasonable to attribute changes in rank order (Income, Prestige, Security, and Leisure) primarily to the Values Game.

Insert Table S12 about here

Table S12 shows (a) that each of the values was important to some students; (b) that there was no serious ceiling or floor effect, since even the highest and lowest weighted values exhibited sizable variation;

(c) that, in general Interest Field, Income, and Security were the three most important values for this group, whereas Early Entry was the least important; and (d) that in reaching the 40-point limit, students selectively reduced the weights originally assigned--that is, not all weights were decreased proportionately. Students were least willing to give up Income and Interest Field and were most willing to reduce weights for Early Entry, and Prestige.

The low weight given to Early Entry is not surprising, since all the students had already made some commitment to education beyond high school.

It is also interesting to note that the standard deviations show very little reduction. Indeed, in two cases (Helping Others and Security), they increase. Thus, the restricted case does not appreciably reduce the variance of the weights.

Selection of interest field. Before weighting the value Interest Field, students indicate which one of the six fields interests them most. They are given the opportunity to change fields before they adjust their weights to sum to 40 and whenever they elect to return to the Values system to review the weights originally assigned.

Table S13 shows the number of times each field was selected. Note that "N = 694" in this table means that 694 interest field selections were made by the sample of students. Some may have chosen the same field more than once, and others may have changed fields.

Insert Table S13 about here

Table S13 shows that the Personal Contact interest field was clearly the most popular, followed by the Scientific, Administrative, and Verbal fields. The Technological and Aesthetic fields were least popular.

Data from the Locate System

In Locate, students select a set of five values as a screen for retrieving potentially attractive occupations. The students specify a minimum return they would like on each value, and the computer then lists occupations that meet or exceed that minimum for each of the five values. Although students may choose any five of the ten SIGI values, the students are encouraged to choose their top-weighted ones.

Values selected for the screen. Table S14 shows the frequency with which each of the 10 values was selected as a member of the retrieval set. It may be inferred that students tend to use their most cherished values in Locate, for there is close agreement between the rank order of the value weights (Table S12) and the rank order of the frequencies in Table S14.

Insert Table S14 about here

Specification levels or categories. For each value except High Income and Interest Field the student may specify one of four possible levels; there are five levels for Income, and there are six categories (not levels) for Interest Field. Table S15 shows the frequency with which the various levels or categories were specified. Again, the n's and the numbers listed in the "FREQ" column indicate the number of times a value or specification was used, not the number of students making the specifications. Also, the numbers are associated only with values/specifications that actually retrieved acceptable lists of occupations. If a student's specifications are too strict or too loose, resulting in empty lists or ones of unwieldy size, he must alter the specifications, one at a time but in any order, until he finally arrives at a set that does retrieve.

Table S15 indicates that all the degrees of specification are used.

Insert Table S15 about here

The fact that the retrieval of an empty list forces the student to lower a specification (or change interest fields) may account for the frequency with which the lowest specification appears. (A value set at the lowest level does not screen, since all occupations meet or exceed that specification.) Table S15 also shows that students tend to specify mostly average and above average levels, and that when they use Interest Field as one of their search values, the most popular field (Personal Contact) was the one most frequently chosen in the Values system.

Occupations retrieved in Locate. What occupations do these values/specifications retrieve? Table S16 lists all the occupations in SIGI at the time of the data collection and the frequency with which each was retrieved. The frequencies include the interaction of initiates (students who have gone through the six subsystems in the prescribed order and who are consequently privileged to return to any subsystem) as well as novices.

In all, 143 occupations of the 155 in SIGI were retrieved for a total of 9,419 times. As would be expected from the relative popularity of various levels of specification, professional occupations were much

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Insert Table S16 about here

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more frequently retrieved than were nonprofessional occupations. The 12 occupations that were not retrieved are

Actor/Actress
Automobile Salesworker
Dental Assistant
Dancer/Dancing Teacher
Flight Attendant
Instrument Repair Technician
Science Laboratory Technician
Real Estate Agent
Typist
Welder
Keypunch Operator
Stenographer

No occupation appeared more frequently than about 3.3% of the total frequency for novices and initiates. If we pool the various teaching occupations, the most frequently retrieved occupations would be

Teacher
Lawyer
Psychologist
Physician
Speech Pathologist/Audiologist
Dentist
Civil Engineer
Industrial Engineer
School Counselor

Data from the Compare System

Occupations selected for examination. Table S17 shows the frequency with which students (initiates and novices) selected occupations for examination in the Compare system. Students may select any occupations they want, but they are particularly encouraged to investigate occupations retrieved in Locate because those occupations tend to satisfy their values.

There were only two occupations (Diesel Mechanic and Instrument Repair Technician) that students never selected. Students did not confine themselves only to occupations retrieved in Locate. For example, Actor/Actress, which was not retrieved at all in Locate, was selected 17 times in Compare; Dental Assistant, which also failed to appear in Locate, was selected 17 times. On the other hand, the secondary school teaching

Insert Table S17 about here

occupations, which were among the most frequently retrieved in Locate, were asked about in Compare with relatively low frequency. It seems possible that many students tended to avoid the teaching occupations because they knew the job market has turned sour. In general, however, the two sets of frequencies appear to be quite consistent. The occupation most frequently asked about (about 2.7% of the total frequency) was School Counselor. In comparing absolute frequencies of occupations retrieved in Locate with those used in Compare, one must allow for the fact that a given occupation may be retrieved several times by one student through various lists of specifications in Locate, but will probably be selected only once by that student for examination in Compare.

Questions for which answers were sought. Students may ask up to 28 questions about the occupations they have selected. (For a list of the questions, see Figure 2, Chapter II.) Table S18 shows the frequency with which each of the questions was asked. All the questions were asked with considerable frequency, the highest being 7.98% of the total. The least favored were "Opportunities for leadership?" and "Prestige level?" The five most often chosen were, in order,

Insert Table S18 about here

Description of work activities?
Education required--Early Entry?
Definition of occupation?
Related college courses?
Beginning salary?

Data from the Prediction System

Reports of previous academic performance. Table S19 summarizes students' responses to questions about their previous academic performance. The responses are stored by the computer and may (or may not) be included among the predictor variables in any of the regression equations that compute the probability of a student's receiving various grades in a particular "key course." Table S19 shows that over 70% of the Santa Fe Community College students reported that they had ranked in the second or third fifth of their high school class and that their mathematics grades had been mostly B's and C's. They presented a somewhat rosier picture with respect to their English grades; more than a quarter of the students reported that they had earned A's, and more than 70% of them said they had got B or better. On the other hand, fewer than half of them were confident that they needed no help with English, and about one-third of them believed positively that they did need help. Perhaps the students did not think that a grade of B or better in high school English guaranteed sufficient mastery for college work.

Insert Table S19 about here

Programs for which predictions were requested. The list of programs for which the student can obtain predictions is different at each college. At the time of the evaluation, predictions were available in 65 programs at Santa Fe Community College. Table S20 lists these programs and shows the frequency with which each was selected in the Prediction system.

Students sought predictions in all the programs except Mid-Management--Marketing and Radiologic Technology. The programs most frequently selected were Psychology, Industrial Design, Business Administration, Engineering, Child Development, and Forestry.

Insert Table S20 about here

Selection of questions about probability. Also available in the Prediction system are explanations of probability and prediction. The explanations are in the form of answers to five questions that the student (novice or initiate) may ask if he chooses. (See Figure 5, Chapter II for the wording of the questions.) The questions were included in SIGI because we knew from our past experience that the concept of probability is difficult for many students. The frequency with which each question was selected appears in Table S21. Assuming one question per student, 123 students sought answers to one or another question. This is two-fifths (40%) of the students using the Prediction system, if we assume that the number of students is the same as or close to the number that reported their previous academic performance in Table S19--in the case of Santa Fe, 305.

Insert Table S21 about here

Data from the Strategy System

(No summary data are collected from the Planning system. Indeed, the only information from that system that is worth recording as summary data would be the names and frequencies of the occupations selected for planning.)

In Strategy, the student selects a set of three occupations and indicates which one he favors most. Then he sees the Desirability Sums of the occupations. (See Chapter II, pages 32-34 for a description of Desirability Sums.) Next, he interacts with a discussion of a decision-making strategy based on assessment of rewards and risks, after which he estimates the probabilities of his successfully completing all the requirements for entry into each of the occupations. Finally, he once again indicates which of the occupations he favors most in light of the information he has accumulated about rewards (Desirability Sums) and risks (probability of entry).

Table S22 shows, in the first two columns, the frequency with which occupations were designated first choice when the set of three occupations was selected, and, in the third and fourth columns, the frequency with which they were designated first choice after assessment of rewards and risks.

Insert Table S22 about here

We must be cautious in interpreting Table S22, since it shows frequencies of choice, not changes. We cannot infer, for instance, that no students changed their minds about an occupation that has the same "post" frequency as "pre" frequency. We may note, however, that the most popular occupations, in terms of post frequency, were School Counselor, Lawyer, Legal Assistant, and Rehabilitation Counselor. Also, if we list occupations with a difference of 3 or more (in either direction) between the pre and post frequencies, we see that Rehabilitation Counselor, Civil Engineer, and Veterinarian made gains (6, 5, and 5 respectively), whereas Elementary School Teacher, Model, and Registered Nurse had losses (5, 3, and 3 respectively).

Choice in relation to desirability outcomes. What influences students' choice of occupation in this context? Table S23 provides some insights. Under the heading "Desirability Outcome" are the frequencies with which students, in their pre choice, selected the occupation that later turned out to have the highest Desirability Sum, to come within 10 points of the highest sum[1], or to fall more than 10 points below the highest. Apparently, almost half the time (47%) students did not designate as their first choice the occupation that, as they soon learned, was the most likely to satisfy their values.

Insert Table S23 about here

The next set of figures, under the heading "Which Strategy," assesses the post choice of occupation with respect to the measures of reward and risk. The reader should understand that the options listed in the table do not all exist at the same time. For example, if the student had estimated that his chances were equal for successfully entering each of the three occupations, he would have only the last two options on the list: He could choose either the occupation with the greatest Desirability Sum or one with a smaller sum. If he had made differential estimates of success, some of the first four options would be present, but not the last two; moreover, it might be that none of the three occupations had the fortunate combination of greatest Desirability Sum and greatest chances, and therefore the student would not have the first option. The reader should also remember that Sum high means having the highest Desirability Sum or coming within 10 points of the highest.

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[1] Students are told to ignore differences of 10 points or less between Desirability Sums. For a discussion of how the 10-point "error" term was estimated, see Counselor's Handbook for SIGI (which is Appendix G of this report), pp. IX-12--IX-14.

Nevertheless, we can make some inferences. The first four categories under "Which Strategy" represent instances of differences in both sums and chances. If we make the reasonable assumption that students would nearly always choose "Sum high, chances high" when that option was present, we have left 147 instances (68 + 55 + 24) where students had to choose on the basis of highest sum, best chances, or some combination in which neither factor was best. In 68 instances (46% of the time), they selected the occupation with the highest sum; in 55 instances (37% of the time), they selected the occupation with the best chances; and in 24 instances (16% of the time), they selected an occupation that had neither the highest sum nor greatest chances. (This last is not necessarily an illogical choice, since it may be the best combination of reward and risk. See Counselor's Handbook for SIGI, which is Appendix G of this report, pages IX-25--IX-26.) There were 24 occasions when students estimated their chances as equal for all three occupations. In this situation, they made the apparently logical choice (occupation with the highest sum) 14 times and the apparently illogical one 10 times. We must be careful, however, not to infer that those 10 choices came from students who did not know what they were doing. We have learned from our interviews that behavior which appears inexplicable in printouts often has some logical explanation--even if it is only that the student was late for class and pushed the last few buttons at random to reach "sign off" as quickly as possible.

Table S1: Responses by Experimentals and Controls for Questions 1-41 of SIGI Evaluation Questionnaires

(Unless otherwise noted, all figures except n's are percent.)

C		E		
			PERSONAL INFORMATION	
	1.		Age:	$n_E = 86$ $n_C = 114$
70		63	(1) 15-22	
23		29	(2) 23-30	
7		7	(3) Over 30	
0		1	(4) Rather not say	
	2.		Sex:	$n_E = 86$ $n_C = 114$
38		41	(1) Male	
62		59	(2) Female	
	3.		Year in college:	$n_E = 74$ $n_C = 101$
55		46	(1) 1st	
34		31	(2) 2nd	
5		5	(3) 3rd	
2		7	(4) 4th	
4		11	(5) Graduate student	
			CAREER DECISION-MAKING	
	**4.		How well do you know what rewards and satisfactions you want from an occupation?	$n_E = 86$ $n_C = 114$
12		43	(1) I know exactly what I want from an occupation.	
70		54	(2) I have a general idea of what I want from an occupation.	
16		3	(3) I'm not sure what I want from an occupation.	
2		0	(4) I have no idea what I want from an occupation.	
	**5.		How many occupations have you explored as possibilities for yourself?	$n_E = 86$ $n_C = 114$
8		1	(1) None	
51		20	(2) 1-2	
29		45	(3) 3-4	
12		34	(4) More than four	
	**6.		How many of the occupations that you know about are likely to give you the satisfactions you want?	$n_E = 86$ $n_C = 111$
17		0	(1) None	
62		62	(2) 1-2	
13		30	(3) 3-4	
8		8	(4) More than 4	
	**7.		Which of the statements below best describes how definite your career plans are?	$n_E = 86$ $n_C = 114$
18		36	(1) I know exactly the occupation I want to enter.	
24		30	(2) I am trying to decide between two different occupations.	
37		28	(3) I am considering three or more different occupations.	
21		6	(4) I do not have any specific occupation in mind at this time.	
	*8.		How well do you think you can predict your grades in various programs at your college?	$n_E = 86$ $n_C = 114$
34		53	(1) I think I could predict my grades accurately in any program of study I might take.	
38		34	(2) I think I could predict my grades accurately in one or two programs, but not in all	
18		10	(3) I have only a general idea of my grades in one or two programs.	
10		2	(4) I can't predict my grades well in any program.	
	**9.		Which of the following best describes the present state of your plans?	$n_E = 86$ $n_C = 114$
18		53	(1) I know which program to enroll in, which courses to take, and most of the other steps necessary to reach my occupational goal.	
45		37	(2) I have a general idea of which program would be best, but I am not sure what other steps are necessary to reach my occupational goal.	
37		9	(3) I don't know which program to take. I need help in planning my education.	

Table S1 (continued)

C **		E	
	10.		Overall, how confident do you feel about your career decision-making skills?
18		40	(1) Very confident $\underline{n}_E = 79$ ($\underline{n}_C = 114$)
63		57	(2) Somewhat confident
19		3	(3) Not confident

Items 11-18 are activities related to thinking about occupations. Put a check under the heading which shows how much time you have spent on each of the activities.

		Never	Rarely	Sometimes	Often
*11.	Reading about occupations. $\underline{n}_E = 81$ ($\underline{n}_C = 114$)	2(5)	21(25)	44(54)	32(16)
12.	Talking with friends about the kinds of occupations they are considering. $\underline{n}_E = 81$ ($\underline{n}_C = 114$)	1(2)	9(8)	44(39)	46(51)
13.	Talking with people in the field about their occupations. $\underline{n}_E = 80$ ($\underline{n}_C = 113$)	2(4)	21(25)	42(36)	34(35)
**14.	Using the college's career reference library. $\underline{n}_E = 80$ ($\underline{n}_C = 111$)	38(61)	29(28)	30(10)	4(1)
15.	Attending career planning workshops. $\underline{n}_E = 80$ ($\underline{n}_C = 113$)	62(72)	25(20)	11(6)	1(2)
16.	Talking to a guidance counselor about careers. $\underline{n}_E = 75$ ($\underline{n}_C = 114$)	21(21)	29(36)	41(32)	8(11)
*17.	Using career-related audiovisual materials. $\underline{n}_E = 80$ ($\underline{n}_C = 112$)	45(65)	36(23)	15(12)	4(0)
**18.	Using a computer-based guidance system. $\underline{n}_E = 80$ ($\underline{n}_C = 113$)	12(90)	48(7)	29(3)	11(0)

For statements 19-24, put a check under the heading that best describes how you feel.

		Strongly Disagree	Disagree	Agree	Strongly Agree
19.	I would follow the advice of a teacher, counselor, parent, or friend in planning my career. $\underline{n}_E = 81$ ($\underline{n}_C = 111$)	5(4)	31(33)	60(56)	4(7)
*20.	Which occupation I enter will be mostly a matter of chance. $\underline{n}_E = 82$ ($\underline{n}_C = 114$)	51(36)	39(56)	6(8)	4(0)
*21.	Everyone seems to tell me something different, so I don't know which career to choose. $\underline{n}_E = 82$ ($\underline{n}_C = 114$)	33(18)	48(52)	19(26)	0(4)
22.	I will decide for myself which occupation to choose. $\underline{n}_E = 82$ ($\underline{n}_C = 114$)	1(1)	4(2)	37(45)	58(52)
23.	In order to plan for a career, I would need to know how soon I would be getting married. $\underline{n}_E = 82$ ($\underline{n}_C = 113$)	40(41)	39(46)	17(11)	4(2)
24.	There is plenty of time before I have to start thinking about choosing an occupation. $\underline{n}_E = 82$ ($\underline{n}_C = 113$)	28(31)	60(56)	12(10)	0(3)

Table S1 (continued)

		X̄	S.D.
✱✱ 25. Rate yourself on how good a career decision-maker you think you are.	$n_E = 85$	7.29	1.86
	$n_C = 112$	6.00	2.14

Look at the scale below. Think of a friend your age who, in your opinion, makes good career decisions. Consider that person at the top of the scale (10).

Think of a friend your age who is not a good career decision-maker. Consider that person at the bottom of the scale (0).

Now think about yourself as a career decision-maker. Where do you fit on this scale? Circle the appropriate number on the scale from 0 to 10.

	0	1	2	3	4	5	6	7	8	9	10
E	0	1	0	3	5	6	14	13	33	16	8
C	1	2	3	8	10	17	12	18	19	7	3

A poor career decision-maker — A good career decision-maker

For items 26- 29 mark an X on the part of the scale which best shows what is true of you.

		X̄	S.D.
✱✱ 26. How much do you know about occupations?	$n_E = 84$	2.69	.82
	$n_C = 114$	2.12	.90

	0		1		2		3		4
E	0	0	11	1	18	8	42	12	8
C	3	1	17	2	41	8	21	2	5

very little — a great deal

		X̄	S.D.
✱✱ 27. How often do you plan ahead?	$n_E = 84$	3.14	.74
	$n_C = 114$	2.78	1.08

	0		1		2		3		4
E	0	0	2	0	14	2	42	10	30
C	3	0	8	1	23	4	28	3	20

rarely — often

		X̄	S.D.
✱ 28. How do you feel after making an important decision?	$n_E = 84$	3.09	.69
	$n_C = 115$	2.83	.83

	0		1		2		3		4
E	0	0	1	0	14	6	46	7	25
C	2	0	3	1	22	3	45	8	16

I usually don't think I've done the right thing. — I am sure I did the right thing.

		X̄	S.D.
✱✱ 29. How clear is your knowledge of goals and values?	$n_E = 84$	3.21	.63
	$n_C = 114$	2.88	.93

	0		1		2		3		4
E	0	0	0	0	11	4	49	7	30
C	2	0	4	3	20	3	39	4	25

not clear — very clear

OCCUPATIONAL INFORMATION

		X̄	S.D.
30. What occupation would you most like to prepare yourself for eventually? Even if you are undecided, pick an occupation that appeals to you.	$n_E = 72$	6.37	.97
	$n_C = 70$	6.14	1.14

Name of occupation: Items 31+32+33+34, Information Test

Table S1 (continued)

% Right | % Wr

Answer questions 31-34 in relation to the occupation named in Item 30.

E 83 17
C 81 19
31. To enter this occupation, how much education beyond high school would you need?

___ (1) None.
___ (2) 2 years.
___ (3) 4 years (bachelor's degree).
___ (4) 5-6 years (master's degree).
___ (5) 7 or more (doctorate or law degree).
___ (6) Other (please explain: ______________________________)
___ (7) I don't know.

E 56 44
C 41 54
32. Check the salary range that indicates the average amount of money per year earned by people in this occupation.

___ (1) \$20,000 or more
___ (2) \$15,000-\$19,999
___ (3) \$11,000-\$14,999
___ (4) \$8,000-\$10,999
___ (5) \$7,999 or less
___ (6) I don't know.

E 42 58
C 30 70
33. Check the one statement which best describes the amount of supervision usually received by workers in this occupation.

___ (1) Work without supervision; plan own work; seldom evaluated by others.
___ (2) Supervised weekly; follow overall assignments.
___ (3) Supervised daily; work under supervisor who assigns and schedules work; free to decide details of work.
___ (4) Supervised hourly; activities are directly supervised with little opportunity to act on your own.
___ (5) I don't know.

E 58 42
C 61 39
34. Check the one statement which best describes the future employment prospects for workers in this occupation.

___ (1) Excellent: Strong demand for workers; shortage of qualified people.
___ (2) Good: Steady demand for workers.
___ (3) Fair: Demand limited except in certain geographic areas OR demand is decreasing due to automation or economic conditions.
___ (4) Poor: Little demand, if any; the occupation is very overcrowded, and few jobs are available.
___ (5) I don't know.

35. What college program (major) are you presently enrolled in? ____________________

36. What occupation are you preparing for in this program or major? ____________________

CAREER GUIDANCE

37. Have you seen a counselor during the last two months?
$n_E = 86$ 62 (1) Yes 38 (2) No
$n_C = 115$ 59 (1) Yes 41 (2) No

C	E	38. If yes, what thing(s) did you discuss? $n_E = 155$ ($n_C = 191$)
13	10	(1) Your values
14	16	(2) Occupational choice
11	10	(3) Occupational information
13	17	(4) Curriculum choice
21	22	(5) Course selection
8	4	(6) Chances for success
8	9	(7) Program approval
3	2	(8) Family pressures
6	10	(9) Financial aid
3.	1	(10) Other (please explain: ______________________________)

Table S1 (continued)

39. Have you taken or are you presently enrolled in a career guidance course at your college? $n_E = 80$ 19 (1) Yes 81 (2) No

$n_C = 114$ 25 75

C E

40. If yes, how would you rate it? $n_E = 15$ $n_C = 28$

39 47 (1) Excellent

57 47 (2) Adequate

4 7 (3) Poor

41. How do you feel about interacting with a computer for career guidance? $n_E = 81$ $n_C = 108$

66 70 (1) Favorable

34 27 (2) Neutral

0 2 (3) Unfavorable

$*p < .05$

$**p < .01$

Table S2

Occupations Named by Experimentals in Response to Question #30

In SIGI[a]	Not in SIGI	Too Vague to Classify
(72 occupations)	(8 occupations)	(6 responses)
Accountant (2)[b]	Business Administration	Business (3)
Auto Mechanic (2)	Cardiovascular Technician	Medical
Bookkeeper	Child Psychiatrist	Own Name
Chemical Engineer	Fashion Merchandising	(Blank)
Clothing Designer (2)	Military	
Commercial Artist	Wildlife Conservationist	
Dental Hygienist	Youth Counselor (Christian)	
Electrical Engineer (4)	Zoo Keeper	
Farmer		
Forester (2)		
Industrial Engineer (2)		
Interior Designer		
Lawyer (3)		
Legal Assistant (2)		
Nurse, Practical		
Nurse, Registered (2)		
Occupational Therapist		
Oceanographer (2)		
Pharmacist		
Photographer		
Physician (2)		
Physician's Assistant (2)		
Physicist (2)		
Psychologist (4)		
Radio/TV Announcer		
Receptionist		
Respiratory Therapist		
Retail Store Manager		
School Counselor (5)		
Secretary (2)		
Securities Broker		
Social Worker (2)		
Teacher, Early Childhood		
Teacher, Elementary (2)		
Teacher, Foreign Language		
Teacher, Physical Education (2)		
Teacher, Physical Science		
Teacher, Special Education		
Teacher, Voc/Tech		
Typist (2)		
Urban Planner (3)		
Zoologist		

---

[a] If the occupational title used by student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Nursery School Teacher" is listed as "Teacher, Early Childhood," "Fashion Designer" as "Clothing Designer," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table S3

Occupations Named by Controls in Response to Question #30

In SIGI[a]	Not in SIGI	Too Vague to Classify
(70 occupations)	(17 occupations)	(28 responses)
Accountant	Advertising Rep	Animal Science
Actor/Actress	Animal Conservationist	Aviation
Architect	Biological Parks Technologist	Boss
Architectural Technician	Builder	Business (2)
Beautician	Cardiovascular Tech (2)	Business or Helping Relation Field
Botanist	Clothes Buyer	Communication (2)
Chef/Cook (2)[b]	Dean of Girls	Conservation, working with animals
Civil Engineer	Environmental Engineer	Criminology
Chemist (2)	Foreign Trade Specialist	Education
Clothing Designer	Horticulturist	Helping Profession
Commercial Artist	Land Developer	Marketing
Dental Assistant	Ornamental Horticulturist	Medical
Dentist	Parole Officer	Physical Education (4)
Drafter	Producer of Concerts	Plant Man
Electrical Engineer (2)	Retail Merchandising-Buyer	Social, maybe health-related field
Electronics Technician	Teacher, Drama	Working with small children
Fine Artist		Writer
Flight Attendant		Undecided
Forester (2)		(Blank) (5)
Hotel/Motel Manager		
Interior Designer		
Lawyer (2)		
Musician (3)		
Nurse, Registered (6)		
Oceanographer		
Operating Room Technician		
Pharmacist (2)		
Photographer		
Physician		
Physician's Assistant (2)		
Pilot (2)		
Psychologist		
Public Relations Worker (3)		
Real Estate Agent		
Receptionist		
Respiratory Therapist		
Retail Store Manager (2)		
School Counselor (3)		
Secretary (2)		
Teacher, Art		
Teacher, Business		
Teacher, Elementary		

Table S3 (continued)

In SIGI[a]

Teacher, English (3)
Teacher, Physical Eduation
Typist (2)
X-Ray Technologist

---

[a] If the occupational title used by the student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Fashion Designer" is listed as "Clothing Designer," "Airline Pilot" as "Pilot," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table S4

Responses to Questions 42-45 of SIGI Evaluation Questionnaire for Controls

(Unless otherwise noted, all figures except *n*'s are percent.)

42. Are you aware that there is a computerized guidance system (SIGI) on campus? n = 112
97 (1) Yes 3 (2) No

43. If yes, what is your impression of SIGI? n = 113
62 (1) Favorable
27 (2) Neither favorable nor unfavorable
0 (3) Unfavorable
11 (4) No impression

44. How did you learn about SIGI? n = 132
36 (1) Friends
36 (2) Counselor
7 (3) Posters, Brochures
7 (4) Newspaper
14 (5) Other (please explain: ______________________________)

45. Do you want to use SIGI? n = 107
99 (1) Yes 1 (2) No

If yes, when? ______________________________

If no, why not? ______________________________

PLEASE RETURN THIS QUESTIONNAIRE TO ETS IN THE ENVELOPE PROVIDED.

THANK YOU FOR YOUR COOPERATION.

Table S4A

Control Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #38 (Other Reasons for Seeing a Counselor)

College selections.
Information on higher institutions.
Possibility of early entry.
Whether or not to stay in school.
CLEP and university entrance.

Question #44 (Other Ways of Learning About SIGI)

Instructor--teacher. (Mentioned by 3 students.)
Sherry Bookman knows my father and she suggested that I try it.
My BE100 class. (Mentioned by 4 students.)
VA counselor.
My son.

---

[a] Some of the responses have been slightly edited.

Table S5

Responses to Questions 42-88 of SIGI Evaluation Questionnaire for Experimentals

(Unless otherwise noted, all numbers except n's are percent.)

EVALUATION OF SIGI

Circle the grade that you would give SIGI on each of the following:

42. How interesting was SIGI to you? $n = 84$	63 A,	27 B,	7 C,	2 D, or	0 F
43. How clear was SIGI in giving information? $n = 84$	A, 65	B, 26	C, 8	D, or 0	F 0
44. Overall, how good is SIGI? $n = 84$	A, 55	B, 38	C, 6	D, or 1	F 0

Circle the grade that shows how useful SIGI was in each of the following:

45. Helping you decide which occupation to prepare for. $n = 83$	29 A,	41 B,	23 C,	5 D, or	2 F
46. Helping you become more aware of your values. $n = 85$	62 A,	25 B,	11 C,	1 D, or	1 F
47. Showing you the relationship between values and career decisions. $n = 84$	51 A,	36 B,	11 C,	2 D, or	0 F
48. Helping you find out which occupations might fit your values. $n = 84$	55 A,	30 B,	13 C,	1 D, or	1 F
49. Helping you get information about occupations. $n = 85$	A, 59	B, 20	C, 20	D, or 1	F 0
50. Helping you understand grade predictions expressed in probabilities. $n = 81$	31 A,	35 B,	28 C,	6 D, or	0 F
51. Helping you estimate probabilities of success in one or more programs. $n = 84$	31 A,	40 B,	21 C,	5 D, or	2 F
52. Giving information about programs of study at your school. $n = 85$	A, 46	B, 32	C, 19	D, or 1	F 2
53. Helping you plan a program appropriate for an occupation you are considering. $n = 83$	41 A,	35 B,	16 C,	5 D, or	4 F
54. Helping you learn how to make career decisions. $n = 85$	A, 36	B, 39	C, 21	D, or 2	F 1

55. What role has SIGI played in your occupational choice? $n = 86$
14 (1) SIGI helped me to choose an occupation.
45 (2) SIGI helped confirm the choice I had already made.
37 (3) SIGI suggested other things which I am considering.
3 (4) SIGI provided little or no help.

Table S5 (continued)

To get help with occupational and educational decisions, you can go to SIGI and to a counselor. For each of the following, (56-63), put a check under the heading which, in your opinion, represents the best source of help.

	SIGI Alone	Counselor Alone	SIGI & Counselor
56. Plan program of study $n_E = 82$	9	18	73
57. Get information about occupations $n_E = 82$	28	9	63
58. Confirm an occupational choice $n_E = 80$	30	16	54
59. Find occupations that fit values $n_E = 79$	44	5	51
60. Find out about financial aid $n_E = 78$	13	33	54
61. Make values more clear $n_E = 81$	52	9	40
62. Resolve conflicts about occupational choice $n_E = 80$	28	10	62
63. Estimate chances of success in a program $n_E = 80$	36	9	55

64. Have you scheduled or do you plan to schedule an appointment with a counselor as a result of using SIGI? $n_E = 92$ 41 (1) Yes 59 (2) No

65. If yes, what was or will be the purpose of this visit? Check all the topics you discussed or plan to discuss. $n_E = 154$
4 (1) Your values
16 (2) Occupational choice
13 (3) Occupational information
14 (4) Curriculum choice
17 (5) Course selection
7 (6) Chances for success
7 (7) Program approval
2 (8) Family pressures
6 (9) Financial aid
10 (10) SIGI print-outs
3 (11) Other (please explain: ____________________)

66. In using SIGI, did the occupations of interest to you show up on the list determined by your values? $n_E = 81$ 77 (1) Yes 23 (2) No

67. Were there any occupations missing from SIGI that you were interested in?
____(1) Yes ____(2) No

If yes, name them: ____________________

68. Compared to other kinds of occupational information, how would you rate the occupational information presented in SIGI? $n_E = 80$
76 (1) Better
24 (2) About the same
0 (3) Worse

69. SIGI has 28 questions you can ask about occupations. Are there other questions about occupations that you wish had been in SIGI? $n_E = 76$ 13 (1) Yes 87 (2) No

If yes, what question(s) would you add to the SIGI list?

Table S5 (continued)

70. How would you rate SIGI's writing style and vocabulary? n = 80
0 (1) Too difficult
92 (2) Just right
8 (3) Too simple

71. Did you find sexual, racial, or other bias in SIGI? n = 80 1 (1) Yes 99 (2) No

If yes, give examples:

____

____

____

____

72. Below is a list of problems that may have occurred in using SIGI. Check any that you experienced: n = 72
14 (1) I did not understand some of the directions.
11 (2) The writing on the screen strained my eyes.
4 (3) I had to wait too long for an appointment to use SIGI.
17 (4) There was too much reading.
3 (5) I felt rushed while using SIGI.
11 (6) The computer broke down while I was using SIGI.
4 (7) The writing on the screen was jumbled.
10 (8) I wanted to sign off SIGI, but couldn't.
19 (9) Other (please explain: ________________________)

73. How often did you request a print-out on SIGI? n = 83
73 (1) Frequently
26 (2) Sometimes
0 (3) Once or twice
0 (4) Never

74. After using the computer, did you do anything to get more information on your own? n = 78
65 (1) Yes 35 (2) No

75. If yes, what did you do? n = 71
41 (1) Read
47 (2) Spoke to people in the occupation
4 (3) Used audiovisual material
19 (4) Other (please explain: ________________________)

76. How much time did you spend on SIGI? n = 83
11 (1) 1-2 hours
53 (2) 2-4 hours
34 (3) 4-6 hours or more

77. Did you go all the way through SIGI (including the Strategy section)? n = 82
99 (1) Yes 1 (2) No

78. Over how many sessions did you use SIGI? n = 82
37 (1) One
51 (2) Two
12 (3) Three or more

79. Do you think you would profit from further use of SIGI? n = 83 61 (1) Yes 39 (2) No

80. If yes, how many additional sessions would you like? n = 48
60 (1) One
25 (2) Two
15 (3) Three or more

Table S5 (continued)

81. Which sections would you use most? n =155
16 (1) Values
17 (2) Locate
26 (3) Compare
12 (4) Prediction
19 (5) Planning
9 (6) Strategy

82. Is there anything SIGI didn't cover that you would like it to cover? n =77
9 (1) Yes 91 (2) No

If yes, please explain:

____

____

____

83. Is there any area you wish SIGI had covered more fully? n =79 25 (1) Yes 75 (2) No

If yes, please explain:

____

____

____

84. What did you like best about SIGI? (check one only) n =127
21 (1) Learning about my values
26 (2) Finding occupations that fit my values
20 (3) Getting occupational information
5 (4) Getting grade predictions
11 (5) Learning what courses to take to prepare for an occupation
8 (6) Learning a strategy for making decisions
8 (7) Learning how values affect decisions
2 (8) Other (please explain: ____)

85. What you did on SIGI was completely private. How important is this fact to you? n =85

0		1		2		3		4
21	4	8	2	18	4	20	0	24
privacy made no difference								very important

86. Have you advised friends at your college to use SIGI? n =77 68 (1) Yes 32 (2) No

87. If yes, how many? n =52
29 (1) 1-2
42 (2) 3-5
29 (3) 6 or more

88. Is there anything else you would like to tell us that would help us improve SIGI?

____

____

____

____

____

____

Table S6

Experimental Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #65 (Purpose of Appointment with Counselor)

To see if I can change from clerical to practical nursing.
Discuss experience.
Suggestions about schools.
Values on working.
Help in decision.

Question #67 (Occupations of Interest Missing from SIGI)[b]

Community mental health workers--paraprofessionals, i.e., rehabilitation technicians, cottage parents, special education aides.
Occupations working directly with animals.
Military Officer.
Combinations of two majors (business and language) where and what to do to get the best opportunities.
In the field of agriculture-related occupations.
Soil Conservation.
Underwater welding.
Geography.
Legal aid.
Psychiatric nurse clinician.
FBI or CIA Agent.
Astronomer.
Diplomat.
Journalism--broadcasting combination.
EEG Technologist
Public Relations--broadcasting.
Horticulture--ornamental.
Travel Business.
Motorcycle Mechanic.
Playwriting.
Art Historian.
Set Designer.
Free-lance Writer.

Question #69 (Additional Questions Students Would Like to Ask)[b]

In what sections of the country are jobs to be found (i.e., New England, Southeast, etc.)?
What is the future outlook for a 10-year prediction?
Specific information about job opportunities and firms.

Question #71 (Examples of Bias in SIGI

Value judgment in presenting jobs from the imaginary placement center.
As a white male, I wasn't looking for, nor was I sensitive to any bias.
I'm white, middle-class, college-educated, blond, blue-eyed, and American.

Table S6 (continued)

Question #72 (Other Problems in Using SIGI)

Many things required "print"--which I didn't want. It caused a delay for me time-wise. (Mentioned by 3 students.)

No erase possible.

When you have the opportunity to go back, it makes you wait for printouts which you already have. Frustrating. Waste of time and paper.

Slow printout. (Mentioned by 2 students.)

Getting the answer of "illegal response."

I had to take more printouts than I wanted. (Mentioned by 3 students.)

SIGI should not be done in one sitting.

Couldn't go back at time I desired it.

Writing on the screen strained my eyes.

Printout had almost faded into oblivion...poor copies.

Had to listen to a long explanation because I pushed the wrong button.

Question #75 (Other Steps Taken to Get More Information After Using SIGI)

Went back to work.

Planned.

Thought.

Talked with parents.

Counselor.

Wrote off for additional information. (Mentioned by 3 students.)

Took two more tests.

Checked on probable courses of action.

Question #82 (Additional Topics SIGI Could Have Covered)[b]

Combination of two majors--business and foreign languages.

Yes, more questions in prediction.

More extensive planning of upper division courses.

More precise information as to where are the jobs available--states and cities.

The bad points in teaching elementary school.

A list of the counselors at this college.

General life style influences.

More details about colleges.

Question #83 (Areas that Should Have Been Covered More Fully)

Professional responsibilities and/or psychological strain involved in the helping professions. Difficult to leave "sickness" at work. Thus, ability to use leisure well is affected.

More agricultural fields.

The full 4-year program of study.

LOCATE.

VALUES.

Job descriptions. (Mentioned by 2 students.)

Planning--course requirements. (Mentioned by 3 students.)

Prediction--course description. (Mentioned by 4 students.)

Duties that go with occupations.

Table S6 (continued)

Question #83 (continued)

Sources of further information on occupations.

Job availability around the nation, statistics in national areas.

A list of occupations.

Values: Physical environment and customary clothing attire for occupation selections.

Colleges.

Question #84 (Other Things Liked Best About SIGI)

None mentioned.

---

[a] Some of the responses have been edited slightly.

[b] In some cases students suggested occupations or innovations already in SIGI.

Table S7

Suggestions for Improvements in SIGI Given by Experimentals in Response to Question #88[a]

SIGI is a great thing, make it available to as many people as possible.

The values games made you choose between two values--sometimes a third value gets in the way and then the computer informs you that your decision does not agree with your values.

Try to combine majors with minors (two majors together).

Include the future outlook (10 years), and the full 4-year curriculum.

I feel that the occupation art teacher had no room for helping people. I disagree.

I didn't like having to print some things and not being able to print others.

SIGI is a little repetitious.

Hard to read (on my eyes).

The course descriptions were inadequate in my opinion.

I really couldn't say much to improve it.

Except for [duties that go with occupations], I feel SIGI is perfect for anyone who wishes to know more about himself, as well as making career decisions, whether a person intends to heed the advice or not. I profited and really enjoyed myself.

I think it is great. Thank you.

Excellent!

A real good service with a lot of potential in helping people to find their niche in life.

Bigger or better occupational choices.

Explain some of the bad points about the occupation.

Very good.

If the printouts could be quicker, or at least revised so that you don't get a printout over again. It made me restless--more anxious to have my specific question answered--also I became more careless.

Thank SIGI very much.

I enjoyed it immensely and recommend it highly.

Table S7 (continued)

Information for people already employed--to help us to decide whether it would be advisable to plan a change. Perhaps comparison of State of Florida positions with business positions.

Is there any way to print only a portion of a screen? Sometimes I received the same thing twice in order to get a second item.

I like it very much.

Too many instructions repeated. Also, if you had to repeat a section, you still got printouts. That took too much time.

---

[a] Some of the responses have been edited slightly.

Table S8: SIGI EVALUATION QUESTIONNAIRE FOR COUNSELORS

BACKGROUND INFORMATION

1. What percent of your time do you spend in career counseling (as opposed to personal counseling, academic advisement, etc.)?
   - 2 (1) None
   - 2 (2) 25% or less
   - 3 (3) 25-50%
   - 0 (4) 50-75%
   - 0 (5) 75-100%

2. On the average, how many students do you see each week for career counseling?
   - 2 (1) None
   - 2 (2) 1-5
   - 2 (3) 5-10
   - 0 (4) 10-20
   - 1 (5) 20 or more

3. How long are most sessions for career counseling?
   - 2 (1) less that 30 minutes
   - 5 (2) 30 minutes to an hour
   - 0 (3) one to two hours

Please indicate whether you agree or disagree with each of the following statements about computer-based guidance systems.

		Agree	Disagree	Not sure
4.	Computer-based guidance systems are a passing fad.	0	7	0
5.	Computer-based guidance systems can relieve counselors of many routine duties, leaving more time for professional counseling activities.	5	1	1
6.	Computer-based guidance systems are a potential threat to the jobs of counselors.	0	6	0
7.	I will probably never make much use of computer-based guidance systems in my work with students.	0	5	1
8.	Computer-based guidance systems are capable of helping students make rational career decisions.	5	0	1

EXPERIENCE WITH SIGI

9. Have you attended a SIGI Counselors' Workshop? 2 (1) Yes 4 (2) No

10. Have you had a chance to use SIGI yourself? 7 (1) Yes 0 (2) No

11. If so, which of the SIGI subsystems have you been through?

	Once	More than once
(1) VALUES	7	0
(2) LOCATE	5	0
(3) COMPARE	5	0
(4) PREDICTION	4	0
(5) PLANNING	3	0
(6) STRATEGY	3	0

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Table S8 (continued)

12. **Have you referred students to SIGI?** 7 (1) Yes 0 (2) No

If so, how many?________

For what reasons?________

13. **How have most students at your college reacted to SIGI?**
7 (1) Favorably
0 (2) Unfavorably
0 (3) No opportunity to observe

14. **Have students come to you with their SIGI printouts?** 7 (1) Yes 0 (2) No

What problems, if any, have you had in helping students interpret their printouts?________

15. **Have students come to you with problems related to use of the SIGI terminals?** 1 (1) Yes 6 (2) No

If so, what kinds of problems have they encountered?________

Prior to having SIGI at your college, to what degree was each of the following (Items 16-22) a problem to you in your role as a counselor?

	Major problem	Minor problem	No problem	Not relevant to me
16. Getting students to read occupational information.	3	2	1	1
17. Keeping up-to-date on occupational information.	3	2	0	2
18. Identifying sources of occupational information.	1	3	1	2
19. Finding time to see all the students who want the help of a counselor.	3	2	2	0
20. Identifying students who need help with their educational and occupational plans.	1	2	4	0
21. Selecting appropriate programs of study for students' career goals.	0	2	5	0
22. Other:________				

23. **Has SIGI had an impact on any of the above problems?** 7 (1) Yes 0 (2) No

If so, which ones? (Circle responses.)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Please explain:	4	6	3	2	3	2	1

Table S8 (continued)

Have you noticed a change in any of the following (Items 24-27) now that SIGI is available to students at your college?

	Increase	Decrease	No change	No opportunity to observe
24. Number of students you are able to see.	1	0	4	2
25. Amount of time you spend doing career counseling.	1	0	4	0
26. Length of career counseling sessions.	1	0	4	0
27. Quality of group discussions about values and career decisions.	3	0	2	0

28. Do you know which of your students have used SIGI and which have not?
4 (1) Yes 3 (2) No

If so, in your opinion do students who have used SIGI rate higher than students who have not used it in their ability to:

	Yes	No	No opportunity to observe
(1) express clearly the satisfactions they want from an occupation?	2	1	0
(2) state their primary occupational choice?	2	1	0
(3) mention alternative possibilities?	3	0	0
(4) indicate sound reasons for their preference?	2	1	0
(5) show they are well-informed about their first-choice occupation?	2	1	0
(6) decide what programs of study are suitable for each occupation being considered?	1	0	2
(7) evaluate their chances of success in programs being considered?	0	1	2

29. How do you think students should gain access to SIGI? (Check one or more.)
4 (1) Terminals should be available to students on a first-come, first-served basis, and follow-up sessions with counselors should be optional.
2 (2) Students should be required during their first year of college to use SIGI and schedule a follow-up session with a counselor.
3 (3) Counselors should refer students to SIGI and require a follow-up session afterward.
5 (4) SIGI should be used as part of a career guidance unit in a classroom course.
2 (5) Other:

SUGGESTIONS FOR IMPROVEMENT

30. What occupations do students frequently ask about that are missing from SIGI?

31. Are there other additional occupations that you would like to see included in SIGI?
1 (1) Yes 1 (2) No

If so, please list them:

32. Are SIGI's writing style and vocabulary appropriate for your students?
6 (1) Yes 1 (2) No

If not, what changes would you suggest?

Table S8 (continued)

33. How does the occupational information in SIGI compare to other sources available to students at your college?
5 (1) Better
1 (2) About the same
0 (3) Worse

34. Did you find any sexual, racial, or other bias in SIGI? 0 (1) Yes 7 (2) No
If so, give examples:____________________________

35. What suggestions do you have for improving SIGI, the Handbook for Counselors, or the Counselors' Workshops?____________________________

OPTIONAL INFORMATION

Members of the SIGI research staff are especially interested in hearing about any personal experiences which you or your colleagues may have had in working with SIGI. Please use the space below to record any observations, amusing anecdotes, students' comments, etc., which you would like to share with us.

Name:____________________________ College:____________________

PLEASE RETURN YOUR QUESTIONNAIRE IN THE ENVELOPE PROVIDED

THANK YOU FOR YOUR COOPERATION

Table S9

Counselors' Responses to Open-Ended Items on the Counselors' Questionnaire[a]

Question 12 (Reasons for Referring Students to SIGI)

Validation of some directions already discussed with student.

I require my students in Behavioral Science to go through SIGI as part requirement for the course.

Students are referred as part of an on-going process in self-assessment--student choice of alternatives.

Career choices (2 responses).

Value clarification as part of course BE 100.

Question 14 (Problems Associated with Printouts)

None (4 responses).

Some students are incapable of successfully completing the preparation required for certain majors.

There seems to be a need for experienced SIGI people to interpret data.

Question 15 (Problems Associated with the Terminals)

This is taken care of by assisting personnel.

Question 22 (Other Problems Associated with Career Counseling)

Career Counseling was very minimal here.

Question 23 (Impact of SIGI on Counseling Problems)

The students at least have one place to go--a central location--for a source of help.

SIGI is centrally located for all students.

Program of value/goal clarification is valuable.

SIGI is something the students can relate to that is objective and reasonable.

Question 29, Item 5 (Other Ways of Making SIGI Available to Students)

Terminal located in major feeder school.

Use of SIGI as part of our alternative student list in self-evaluation and assessment.

Question 30 (Occupations Suggested by Students for Addition to SIGI)[b]

Vocational-Technical.

Table S9 (continued)

Question 31 (Occupations Suggested by Counselors for Addition to SIGI)[b]

Food Service, Child Care.

Question 32 (Suggested Changes in Writing Style)

International students have trouble with some idioms.

Question 34 (Examples of Bias in SIGI)

No responses.

Question 35 (Suggestions for Improvement)

More time explaining results thoroughly as soon as printout is given.

Optional Information

I am very impressed with SIGI. Since I require my students to use SIGI it has added to my classroom discussion on values and has encouraged students to come in for personal counseling. Many times vocational problems turn into personal problems. In counseling I have a hard time separating personal, vocational, occupational, etc. I can only speak in high regards for SIGI and how it has helped me in my work. I feel it is one of the biggest advances in counseling that I have experienced in 20 years.

I am director/counselor of a group of 11th and 12th grade high school students here at the college in a vocational/technical situation involving both vocational and academic courses. We have set up a program of performance objectives from which the students might choose their own program of objectives. Completing SIGI is one of those objectives. The students who have experienced SIGI have been enthusiastic in their response to the program. More students have been choosing this alternative to self-exploration.

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[a] Some of the responses have been edited slightly.

[b] Some ccupations in these fields are already in SIGI.

Table S10

Breakdown of Sample by Age, Sex, and Enrollment Status

Factor	%
Age	
18 or under	32.2
19-21	25.8
22-24	14.5
25 and over	27.5
Sex	
Male	42.2
Female	57.8
Enrollment status	
About to enter	10.5
1st semester or quarter	46.5
Completed 1 or more semesters	27.5
Other	15.5

Table S11

Initial Status with Respect to Career Decisions

VALUE STATUS (N= 460)	FREQ	%
	----	-
I KNOW WHAT I WANT.	132	28.70
GENERAL IDEA OF WHAT I WANT.	222	48.26
WOULD KNOW IF I SAW IT.	41	8.91
I'M IN THE DARK.	65	14.13
OCCUPATION STATUS (N= 460)	FREQ	%
	----	-
I CAN LIST 4 OCCUPATIONS.	41	8.91
1 OR 2 OCCUPATIONS THAT FIT.	104	22.61
NOT SURE THEY FIT MY VALUES.	87	18.91
I NEED LOT OF INFORMATION.	228	49.57
PREDICTION STATUS (N= 460)	FREQ	%
	----	-
PREDICT GRADES IN ANY PROGRAM.	126	27.39
PREDICT GRADES IN SOME PROGRAMS.	201	43.70
GENERAL IDEA OF MY GRADES.	91	19.78
I CAN'T PREDICT MY GRADES.	42	9.13
PLANNING STATUS (N= 460)	FREQ	%
	----	-
KNOW WHICH PROGRAM TO ENROLL IN.	77	16.74
GENERAL IDEA WHICH IS BEST.	206	44.78
DON'T KNOW WHICH PROG. TO TAKE.	177	38.48

Table S12

Means and Standard Deviations for the 10 SIGI Values

Value	Unrestricted[a]		Restricted[b]	
	$\overline{X}$	S.D.	$\overline{X}$	S.D.
Income	5.62	1.71	5.16	1.67
Prestige	4.43	2.05	3.07	1.66
Independence	5.39	1.77	4.46	1.63
Helping Others	5.28	2.25	4.21	2.32
Security	6.07	1.87	4.69	2.40
Variety	5.08	1.99	3.77	1.80
Leadership	4.30	2.12	3.16	1.80
Interest Field	6.07	1.75	5.40	1.75
Leisure	4.26	1.97	3.57	1.83
Early Entry	3.47	2.38	2.27	1.98

[a] Students weighted each value on a scale ranging from 0 (no importance) to 8 (maximum importance), with no restriction on the magnitude of the sum of the weights.

[b] Students were forced to adjust their value weights to sum to exactly 40 points.

Table S13

Frequency with Which Each of the Six Interest Fields Was Selected

Interest Field (N = 694)[a]	Freq[a]	%
Scientific	134	19.31
Technological	71	10.23
Administrative	118	17.00
Personal Contact	190	27.38
Verbal	117	16.86
Aesthetic	64	9.22

[a] The *n* and frequency represent the number of times fields were selected. Students may choose more than once.

Table S14

Frequency with Which Values Were Used for Retrieval in Locate

VALUES USED IN LOCATE (N= [illegible])[a]	[illegible]	
INCOME.	1474	15.[illegible]
PRESTIGE.	494	5.30
INDEPENDENCE.	1251	13.43
HELPING OTHERS.	961	[illegible]
SECURITY.	[illegible]	[illegible]
VARIETY.	[illegible]	[illegible]
LEADERSHIP.	440	4.72
INTEREST FIELD.	1400	15.0[illegible]
LEISURE.	664	7.13
EARLY ENTRY.	[illegible]	[illegible]

---

[a] The n represents the total number of selections, not the number of students using the Locate system.

Table S15

Level or Category of Specification Used in Locate

```
INCOME SPEC LEVELS (N= 1474 )                       FREQ            %
                                                    ----            -
   LESS THAN $8,000 IS OK.                            25         1.70
   MORE THAN $8,000.                                 208        14.11
   MORE THAN $11,000.                                624        42.33
   MORE THAN $15,000.                                428        29.04
   MORE THAN $20,000.                                189        12.82

PRESTIGE SPEC LEVELS (N= 494 )                      FREQ            %
                                                    ----            -
   BELOW AVERAGE IS OK.                               21         4.25
   AVERAGE AMOUNT.                                   251        50.81
   MORE THAN AVERAGE AMOUNT.                         180        36.44
   GREAT AMOUNT                                       42         8.50

INDEPENDENCE SPEC LEVELS (N= 1251 )                 FREQ            %
                                                    ----            -
   BELOW AVERAGE IS OK.                               56         4.48
   AVERAGE AMOUNT.                                   529        42.29
   MORE THAN AVERAGE AMOUNT.                         515        41.17
   GREAT AMOUNT                                      151        12.07

HELPING OTHERS SPEC LEVELS (N= 961 )                FREQ            %
                                                    ----            -
   BELOW AVERAGE IS OK.                               59         6.14
   AVERAGE AMOUNT.                                   225        23.41
   MORE THAN AVERAGE AMOUNT.                         309        32.15
   GREAT AMOUNT                                      368        38.29

SECURITY SPEC LEVELS (N= 1285 )                     FREQ            %
                                                    ----            -
   BELOW AVERAGE IS OK.                               66         5.14
   AVERAGE AMOUNT.                                   491        38.21
   MORE THAN AVERAGE AMOUNT.                         523        40.70
   GREAT AMOUNT                                      205        15.95

VARIETY SPEC LEVELS (N= 909 )                       FREQ            %
                                                    ----            -
   BELOW AVERAGE IS OK.                               22         2.42
   AVERAGE AMOUNT.                                   323        35.53
   MORE THAN AVERAGE AMOUNT.                         381        41.91
   GREAT AMOUNT                                      183        20.13

LEADERSHIP SPEC LEVELS (N= 440 )                    FREQ            %
                                                    ----            -
   BELOW AVERAGE IS OK.                               22         5.00
   AVERAGE AMOUNT.                                   151        34.32
   MORE THAN AVERAGE AMOUNT.                         164        37.27
   GREAT AMOUNT                                      103        23.41
```

Table S15 (continued)

INTEREST FIELD SPEC (N= 1400)	FREQ	%
SCIENTIFIC.	245	17.50
TECHNOLOGICAL.	98	7.00
ADMINISTRATIVE.	174	12.43
PERSONAL CONTACT.	587	41.93
VERBAL.	147	10.50
AESTHETIC.	149	10.64

LEISURE SPEC LEVELS (N= 664)	FREQ	%
SMALL AMOUNT IF ANY.	13	1.96
LESS THAN AVERAGE AMOUNT.	89	13.40
AVERAGE AMOUNT	406	61.14
MORE THAN AVERAGE AMOUNT.	156	23.49

EARLY ENTRY SPEC LEVELS (N= 436)	FREQ	%
5 OR MORE YEARS.	80	18.35
4 YEARS.	187	42.89
2 OR 3 YEARS.	149	34.17
1 YEAR OR LESS.	20	4.59

Table S16

OCCUPATIONS IN LOCATE(NOVICE & INITIATE) (N= 8755^a & 664^b)

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	0	0.00	0	0.00
ADVERTISING COPYWRITER.	8	0.09	0	0.00
AIR COND, REFRIG, & HEAT MECH.	16	0.18	0	0.00
ACCOUNTANT.	14	0.16	0	0.00
AIRCRAFT MECHANIC.	2	0.02	0	0.00
APPLIANCE REPAIR TECHNICIAN.	3	0.03	0	0.00
ARCHITECT.	34	0.39	4	0.60
AUTOMOBILE SALESWORKER.	0	0.00	0	0.00
ARCH. TECH. AND DRAFTSMAN.	4	0.05	0	0.00
AVIONICS TECHNICIAN.	6	0.07	0	0.00
AUTOMOBILE MECHANIC.	15	0.17	0	0.00
ACTUARY.	44	0.50	5	0.75
BROADCAST TECHNICIAN.	23	0.26	0	0.00
BEAUTICIAN.	10	0.11	0	0.00
BOTANIST.	57	0.65	5	0.75
BOOKKEEPER.	4	0.05	0	0.00
BUSINESS MACHINE REPAIR TECH.	8	0.09	1	0.15
BANK OFFICER.	49	0.56	8	1.20
BANK TELLER.	4	0.05	0	0.00
COMMERCIAL ARTIST.	3	0.03	0	0.00
CLOTHING DESIGNER.	13	0.15	2	0.30
CHEMICAL ENGINEER.	89	1.02	11	1.66
CHEMIST.	17	0.19	2	0.30
CLERGY.	66	0.75	1	0.15
COMPUTER OPERATOR.	2	0.02	0	0.00
COMPUTER PROGRAMMER.	24	0.27	0	0.00
CIVIL ENGINEER.	186	2.12	26	3.92
DENTAL ASSISTANT	0	0.00	0	0.00
DENTIST	216	2.47	14	2.11
DENTAL HYGIENIST	32	0.37	0	0.00
DRAFTSMAN	19	0.22	1	0.15
DIETITIAN	62	0.71	7	1.05
DIESEL MECHANIC	12	0.14	0	0.00
DANCER AND DANCING TEACHER	0	0.00	0	0.00
ECONOMIST	46	0.53	4	0.60
ELECTRICAL ENGINEER	39	0.45	3	0.45
ENGINEERING TECHNICIAN	3	0.03	0	0.00
ELECTRONICS TECHNICIAN	28	0.32	0	0.00
FINE ARTIST/PRIVATE ART TEACHER	26	0.30	0	0.00
FUNERAL DIRECTOR	59	0.67	7	1.05
FLIGHT ENGINEER	19	0.22	0	0.00
FLIGHT ATTENDANT	0	0.00	0	0.00
FORESTER	128	1.46	11	1.66
GEOGRAPHER	27	0.31	2	0.30
HOME ECONOMIST	94	1.07	10	1.51
HOTEL/MOTEL MANAGER	31	0.35	3	0.45
INSURANCE AGENT	3	0.03	3	0.45
INTERIOR DESIGNER/DECORATOR	37	0.42	1	0.15
INDUSTRIAL ENGINEER	181	2.07	30	4.52
INDUSTRIAL TRAFFIC MANAGER	25	0.29	1	0.15
INDUSTRIAL DESIGNER	70	0.80	10	1.51
INSTRUMENT REPAIR TECHNICIAN	0	0.00	0	0.00
SCIENCE LAB TECHNICIAN	0	0.00	0	0.00
LIBRARIAN	68	0.78	12	1.81
LABOR RELATIONS SPECIALIST	76	0.87	3	0.45

Table S16 (continued)

LIBRARY TECHNICIAN	3	0.03	0	0.00
LAWYER	266	3.04	16	2.41
MATHEMATICIAN	49	0.56	6	0.90
PHYSICIAN	225	2.57	16	2.41
MECHANICAL ENGINEER	63	0.72	8	1.20
METEOROLOGIST	24	0.27	3	0.45
MEDICAL RECORD ADMINISTRATOR	18	0.21	0	0.00
MEDICAL LAB TECHNICIAN	3	0.03	0	0.00
MODEL	2	0.02	0	0.00
MARKET RESEARCHER	10	0.11	1	0.15
MANUFACTURER'S SALESWORKER.	4	0.05	0	0.00
MEDICAL TECHNOLOGIST.	18	0.21	0	0.00
MUSICIAN/MUSIC TEACHER.	27	0.31	3	0.45
MACHINIST.	27	0.31	0	0.00
NURSERYMAN/LANDSCAPER.	21	0.24	2	0.30
NEWSPAPER REPORTER.	9	0.10	0	0.00
OCEANOGRAPHER.	75	0.86	6	0.90
OPTICIAN.	3	0.03	0	0.00
OCCUPATIONAL THERAPIST.	67	0.77	4	0.60
PURCHASING AGENT.	16	0.18	1	0.15
POLICE OFFICER.	7	0.08	0	0.00
PUBLIC HEALTH SPECIALITST.	85	0.97	2	0.30
PILOT.	33	0.38	3	0.45
POLITICAL SCIENTIST.	144	1.64	16	2.41
PHARMACIST.	22	0.25	3	0.45
NURSE, PRACTICAL.	2	0.02	0	0.00
PHOTOGRAPHER.	22	0.25	2	0.30
PUBLIC RELATIONS WORKER.	8	0.09	0	0.00
PHYSICIST.	4	0.05	0	0.00
PHYSICAL THERAPIST.	42	0.48	3	0.45
PERSONNEL INTERVIEWER.	38	0.43	9	1.36
PRODUCTION MANAGER.	76	0.87	7	1.05
PSYCHOLOGIST.	245	2.80	18	2.71
RADIO/TV ANNOUNCER.	5	0.06	0	0.00
REHABILITATION COUNSELOR.	160	1.83	6	0.90
RECEPTIONIST.	2	0.02	0	0.00
REAL ESTATE AGENT	0	0.00	0	0.00
NURSE, REGISTERED.	13	0.15	1	0.15
RESPIRATORY THERAPIST.	27	0.31	2	0.30
RETAIL STORE MANAGER.	31	0.35	2	0.30
RADIO/TV SERVICE TECHNICIAN.	3	0.03	0	0.00
RECREATION WORKER.	26	0.30	1	0.15
SYSTEMS ANALYST	23	0.26	1	0.15
SOIL CONSERVATIONIST.	96	1.10	11	1.66
SECURITIES BROKER.	35	0.40	11	1.66
SECRETARY.	17	0.19	2	0.30
SCHOOL COUNSELOR.	176	2.01	13	1.96
STATISTICIAN.	25	0.29	1	0.15
SOCIAL SERVICE AIDE.	5	0.06	2	0.30
SPEECH PATHOLOGIST/AUDIOLOGIST.	228	2.60	11	1.66
SINGER AND SINGING TEACHER.	16	0.18	0	0.00
SURVEYOR.	8	0.09	0	0.00
SOCIAL WORKER.	39	0.45	3	0.45
TEACHER AIDE.	2	0.02	2	0.30
TELEPHONE CRAFTSWORKER.	2	0.02	0	0.00
TOOL AND DIE MAKER.	15	0.17	0	0.00
TEACHER, ELEMENTARY SCHOOL	160	1.83	4	0.60
ZOOLOGIST.	57	0.65	5	0.75
TECHNICAL WRITER.	7	0.08	0	0.00
TYPIST.	0	0.00	0	0.00

Table S16 (continued)

URBAN PLANNER.	129	1.47	19	2.86
VETERINARIAN.	76	0.87	8	1.20
WASTEWATER TREATMENT OPERATOR.	3	0.03	0	0.00
X-RAY TECHNOLOGIST.	5	0.06	0	0.00
TEACHER, ART.	268	3.29	20	3.01
TEACHER, BIOLOGY.	295	3.37	16	2.41
TEACHER, BUSINESS.	284	3.24	19	2.86
TEACHER, ENGLISH/LANG. ARTS.	220	2.51	11	1.66
TEACHER, FOREIGN LANGUAGE.	220	2.51	11	1.66
TEACHER, HISTORY/SOCIAL STUDIES.	220	2.51	11	1.66
TEACHER, INDUS. ARTS/VOC.TECH.	184	2.10	7	1.05
TEACHER, MATHEMATICS.	295	3.37	16	2.41
TEACHER, PHYSICAL EDUCATION.	160	1.83	4	0.60
TEACHER, PHYSICAL SCIENCE.	295	3.37	16	2.41
WELDER.	0	0.00	0	0.00
AEROSPACE ENGINEER.	2	0.02	0	0.00
FIREFIGHTER.	8	0.09	0	0.00
KEYPUNCH OPERATOR.	0	0.00	0	0.00
LANDSCAPE ARCHITECT.	38	0.43	5	0.75
OPERATING ROOM TECHNICIAN.	1	0.01	0	0.00
OPTOMETRIST.	145	1.66	22	3.31
TEACHER, EARLY CHILDHOOD.	41	0.47	2	0.30
TEACHER, SPECIAL EDUCATION.	220	2.51	11	1.66
CONSTRUCTION INSPECTOR.	36	0.41	1	0.15
CORRECTION OFFICER.	1	0.01	0	0.00
GEOLOGIST.	8	0.09	3	0.45
HOSPITAL ADMINISTRATOR.	81	0.93	9	1.36
PHYSICIAN'S ASSISTANT.	42	0.48	0	0.00
STENOGRAPHER.	0	0.00	0	0.00
EEG TECHNOLOGIST.	11	0.13	0	0.00
NURSING ASSISTANT.	2	0.02	0	0.00
FLORIST (RETAIL & DESIGNER).	17	0.19	3	0.45
TEACHER, VOCATIONAL/TECHNICAL.	188	2.15	6	0.90
CHEF/COOK.	14	0.16	3	0.45
PLUMBER.	82	0.94	13	1.96
FOOD SCIENTIST/TECHNOLOGIST.	81	0.93	8	1.20
TELEVISION PRODUCER/DIRECTOR.	31	0.35	4	0.60
INTERPRETER/TRANSLATOR.	78	0.89	14	2.11
LEGAL ASSISTANT.	101	1.15	4	0.60
FARMER/FARM MANAGER.	15	0.17	4	0.60

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[a] Retrievals for novices

[b] Retrievals for initiates

Table S17

OCCUPATIONS IN COMPARE (N= 2727[a])	FREQ	λ
ACTOR AND ACTRESS.	17	0.62
ADVERTISING COPYWRITER.	18	0.66
AIR COND, REFRIG, & HEAT MECH.	11	0.40
ACCOUNTANT.	24	0.88
AIRCRAFT MECHANIC.	6	0.22
APPLIANCE REPAIR TECHNICIAN.	5	0.18
ARCHITECT.	23	0.84
AUTOMOBILE SALESWORKER.	1	0.04
ARCH. TECH. AND DRAFTSMAN.	6	0.22
AVIONICS TECHNICIAN.	2	0.07
AUTOMOBILE MECHANIC.	6	0.22
ACTUARY.	13	0.48
BROADCAST TECHNICIAN.	13	0.48
BEAUTICIAN.	10	0.37
BOTANIST.	21	0.77
BOOKKEEPER.	15	0.55
BUSINESS MACHINE REPAIR TECH.	6	0.22
BANK OFFICER.	19	0.70
BANK TELLER.	15	0.55
COMMERCIAL ARTIST.	27	0.99
CLOTHING DESIGNER.	14	0.51
CHEMICAL ENGINEER.	17	0.62
CHEMIST.	7	0.26
CLERGY.	12	0.44
COMPUTER OPERATOR.	19	0.70
COMPUTER PROGRAMMER.	14	0.51
CIVIL ENGINEER.	46	1.69
DENTAL ASSISTANT	17	0.62
DENTIST	38	1.39
DENTAL HYGIENIST	27	0.99
DRAFTSMAN	11	0.40
DIETITIAN	13	0.48
DIESEL MECHANIC	0	0.00
DANCER AND DANCING TEACHER	7	0.26
ECONOMIST	8	0.29
ELECTRICAL ENGINEER	21	0.77
ENGINEERING TECHNICIAN	3	0.11
ELECTRONICS TECHNICIAN	23	0.84
FINE ARTIST/PRIVATE ART TEACHER	16	0.59
FUNERAL DIRECTOR	7	0.26
FLIGHT ENGINEER	4	0.15
FLIGHT ATTENDANT	21	0.77
FORESTER	54	1.98
GEOGRAPHER	4	0.15
HOME ECONOMIST	15	0.55
HOTEL/MOTEL MANAGER	8	0.29
INSURANCE AGENT	2	0.07
INTERIOR DESIGNER/DECORATOR	27	0.99
INDUSTRIAL ENGINEER	39	1.43
INDUSTRIAL TRAFFIC MANAGER	4	0.15
INDUSTRIAL DESIGNER	21	0.77
INSTRUMENT REPAIR TECHNICIAN	0	0.00
SCIENCE LAB TECHNICIAN	2	0.07
LIBRARIAN	9	0.33
LABOR RELATIONS SPECIALIST	15	0.55
LIBRARY TECHNICIAN	3	0.11

Table S17 (continued)

LAWYER	69	2.53
MATHEMATICIAN	5	0.18
PHYSICIAN	39	1.43
MECHANICAL ENGINEER	27	0.99
METEOROLOGIST	4	0.15
MEDICAL RECORD ADMINISTRATOR	10	0.37
MEDICAL LAB TECHNICIAN	7	0.26
MODEL	7	0.26
MARKET RESEARCHER	2	0.07
MANUFACTURER'S SALESWORKER.	1	0.04
MEDICAL TECHNOLOGIST.	13	0.48
MUSICIAN/MUSIC TEACHER.	13	0.48
MACHINIST.	3	0.11
NURSERYMAN/LANDSCAPER.	13	0.48
NEWSPAPER REPORTER.	36	1.32
OCEANOGRAPHER.	30	1.10
OPTICIAN.	2	0.07
OCCUPATIONAL THERAPIST.	35	1.23
PURCHASING AGENT.	8	0.29
POLICE OFFICER.	17	0.62
PUBLIC HEALTH SPECIALITST.	23	0.84
PILOT.	15	0.55
POLITICAL SCIENTIST.	36	1.32
PHARMACIST.	22	0.81
NURSE, PRACTICAL.	7	0.26
PHOTOGRAPHER.	41	1.50
PUBLIC RELATIONS WORKER.	25	0.92
PHYSICIST.	5	0.18
PHYSICAL THERAPIST.	37	1.36
PERSONNEL INTERVIEWER.	16	0.59
PRODUCTION MANAGER.	19	0.70
PSYCHOLOGIST.	70	2.57
RADIO/TV ANNOUNCER.	23	0.84
REHABILITATION COUNSELOR.	68	2.49
RECEPTIONIST.	11	0.40
REAL ESTATE AGENT	14	0.51
NURSE, REGISTERED.	35	1.28
RESPIRATORY THERAPIST.	18	0.66
RETAIL STORE MANAGER.	14	0.51
RADIO/TV SERVICE TECHNICIAN.	2	0.07
RECREATION WORKER.	14	0.51
SYSTEMS ANALYST	7	0.26
SOIL CONSERVATIONIST.	31	1.14
SECURITIES BROKER.	17	0.62
SECRETARY.	29	1.06
SCHOOL COUNSELOR.	74	2.71
STATISTICIAN.	4	0.15
SOCIAL SERVICE AIDE.	18	0.66
SPEECH PATHOLOGIST/AUDIOLOGIST.	42	1.54
SINGER AND SINGING TEACHER.	1	0.04
SURVEYOR.	2	0.07
SOCIAL WORKER.	42	1.54
TEACHER AIDE.	5	0.18
TELEPHONE CRAFTSWORKER.	2	0.07
TOOL AND DIE MAKER.	3	0.11
TEACHER, ELEMENTARY SCHOOL	30	1.10
ZOOLOGIST.	42	1.54
TECHNICAL WRITER.	9	0.33
TYPIST.	14	0.51
URBAN PLANNER.	18	0.66

Table S17 (continued)

VETERINARIAN.	30	1.10
WASTEWATER TREATMENT OPERATOR.	3	0.11
X-RAY TECHNOLOGIST.	26	0.95
TEACHER, ART.	24	0.88
TEACHER, BIOLOGY.	19	0.70
TEACHER, BUSINESS.	13	0.48
TEACHER, ENGLISH/LANG. ARTS.	19	0.70
TEACHER, FOREIGN LANGUAGE.	8	0.29
TEACHER, HISTORY/SOCIAL STUDIES.	9	0.33
TEACHER, INDUS. ARTS/VOC.TECH.	5	0.18
TEACHER, MATHEMATICS.	11	0.40
TEACHER, PHYSICAL EDUCATION.	26	0.95
TEACHER, PHYSICAL SCIENCE.	10	0.37
WELDER.	3	0.11
AEROSPACE ENGINEER.	8	0.29
FIREFIGHTER.	10	0.37
KEYPUNCH OPERATOR.	15	0.55
LANDSCAPE ARCHITECT.	11	0.40
OPERATING ROOM TECHNICIAN.	11	0.40
OPTOMETRIST.	18	0.66
TEACHER, EARLY CHILDHOOD.	39	1.43
TEACHER, SPECIAL EDUCATION.	46	1.69
CONSTRUCTION INSPECTOR.	4	0.15
CORRECTION OFFICER.	26	0.95
GEOLOGIST.	15	0.55
HOSPITAL ADMINISTRATOR.	14	0.51
PHYSICIAN'S ASSISTANT.	35	1.28
STENOGRAPHER.	10	0.37
EEG TECHNOLOGIST.	10	0.37
NURSING ASSISTANT.	15	0.55
FLORIST (RETAIL & DESIGNER).	9	0.33
TEACHER, VOCATIONAL/TECHNICAL.	11	0.40
CHEF/COOK.	9	0.33
PLUMBER.	11	0.40
FOOD SCIENTIST/TECHNOLOGIST.	20	0.73
TELEVISION PRODUCER/DIRECTOR.	32	1.17
INTERPRETER/TRANSLATOR.	21	0.77
LEGAL ASSISTANT.	61	2.24
FARMER/FARM MANAGER.	8	0.29

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[a] Frequency indicates the total number of times an occupation was selected as a subject for inquiry by novices and initiates.

Table S18

QUESTIONS [illegible] COMPARE [illegible][a]	F[illegible]	
DEFINITION OF OCCUPATION?	[illegible]	[illegible].11
DESCRIPTION OF WORK ACTIVITIES?	462	[illegible]
LEVELS OF SKILLS?	192	3.15
WHERE TO GET MORE INFORMATION?	[illegible]	[illegible]
EDUCATION REQUIRED-EARLY ENTRY?	[illegible]	[illegible]
SPECIFIC OCCUPATIONAL TRAINING?	[illegible]	[illegible]
RELATED COLLEGE COURSES?	379	6.11
PERSONAL QUALIFICATIONS?	266	4.42
OTHER REQUIREMENTS?	134	2.11
BEGINNING SALARY?	[illegible]	[illegible]
AVERAGE INCOME-HIGH INCOME?	[illegible]	[illegible]
TOP SALARY POSSIBILITIES?	1[illegible]6	[illegible]
HOW SALARIES VARY?	107	1.77
OPPORTUNITIES TO HELP OTHERS?	132	2.1[illegible]
OPPORTUNITIES FOR LEADERSHIP?	62	1.[illegible]
WHAT FIELDS OF INTEREST?	1[illegible]0	[illegible]
PRESTIGE LEVEL?	91	1.[illegible]
SPECIAL PROBLEMS?	1[illegible]	[illegible]
PHYSICAL SURROUNDINGS?	126	2.0[illegible]
LEISURE-HOURS?	253	4.1[illegible]
INDEPENDENCE ON THE JOB?	162	2.6[illegible]
VARIETY?	139	[illegible]
FRINGE BENEFITS?	11[illegible]	1.[illegible]
EMPLOYMENT OUTLOOK?	277	4.5[illegible]
WHERE ARE THE JOBS?	315	5.21
JOB SECURITY?	164	2.71
ADVANCEMENT?	129	2.13
HOW MANY WOMEN?	117	1.9[illegible]

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[a] Frequency is the total number of times the question was chosen by novices and initiates.

Table S19

Students' Reports of Their Previous Academic Performance

H.S.RANK (N= 305)	FREQ	%
	----	-
TOP FIFTH.	42	13.77
2ND FIFTH.	95	31.15
3RD FIFTH.	128	41.97
4TH FIFTH.	31	10.16
BOTTOM FIFTH.	9	2.95
H.S.MATH GRADES (N= 305)	**FREQ**	**%**
	----	-
MOSTLY A'S.	49	16.07
MOSTLY B'S.	109	35.74
MOSTLY C'S.	114	37.38
BELOW C.	33	10.82
H.S.ENGLISH GRADES (N= 305)	**FREQ**	**%**
	----	-
MOSTLY A'S.	83	27.21
MOSTLY B'S.	137	44.92
MOSTLY C'S.	77	25.25
BELOW C.	8	2.62
NEED HELP WITH ENGLISH (N= 305)	**FREQ**	**%**
	----	-
YES.	101	33.11
NO.	136	44.59
NOT SURE.	68	22.30

Table S20

Programs Chosen in Prediction (N = 717^{a})

	FREQ	%
Accounting	16	2.23
Advertising	8	1.12
Agronomy	12	1.67
Animal Science	12	1.67
Architecture	11	1.53
Biological Parks	8	1.12
Broadcasting	6	0.84
Business, General	10	1.39
Business Administration	26	3.63
Business Education	5	0.70
Cardio. Technology	7	0.98
Career Assoc. Spec. Education	8	1.12
Chemistry	14	1.95
Child Development	20	2.79
Computer & Info. Sciences	16	2.23
Corrections Counseling	19	2.65
Criminology	12	1.67
Data Processing	7	0.98
Dental Assisting	17	2.37
Economics	8	1.12
Elementary Education	14	1.95
Engineering	24	3.35
English	19	2.65
English/Lang. Arts Education	4	0.56
Food and Nutrition	11	1.53
Foreign Language Education: Spanish	9	1.26
Foreign Language Education: French	8	1.12
Forestry	20	2.79
Home Economics	5	0.70
Home Econ.--Child Development	4	0.56
Home Econ.--Food & Nutrition	3	0.42
Industrial Arts Education	1	0.14
Industrial Design	28	3.91
Inhalation Therapy	2	0.28
Landscape Architecture	15	2.09
Law Enforcement	7	0.98
Mathematics	19	2.65
Mathematics Education	5	0.70
Medical Records Science	3	0.42
Medical Technology	11	1.53
Mid-Management	5	0.70
Mid-Management, Marketing	0	0.00
News--Editorial	5	0.70
Nuclear Medicine	5	0.70
Nursing	15	2.09
Occupational Therapy	15	2.09
Pharmacy	12	1.67

Table S20 (continued)

	FREQ	%
Physical Science Education	6	0.84
Physical Therapy	11	1.53
Physician's Assistant	17	2.37
Practical Nursing	6	0.84
Pre-Veterinary Science	11	1.53
Psychology	30	4.18
Public Relations	17	2.37
Radiologic Technology	0	0.00
Real Estate	19	2.65
Registered Nursing	6	0.84
Secretarial	9	1.26
Social Work	18	2.51
Sociology	8	1.12
Soil Science	8	1.12
Statistics	4	0.56
Theatre & Drama	5	0.70
Textiles	14	1.95
Zoology	17	2.37

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[a] The n represents the sum of the individual frequencies, not students.

Table S21

```
QUESTIONS ASKED IN PREDICTION (N= 123 )  FREQ              %
                                         ----              -
    CHANCES IN 100 MEAN?                  28           22.76
    CHANCES OF PASSING COURSE?            30           24.39
    HOW TO PREDICT GRADE.                 20           16.26
    CHANCES GOOD OR BAD.                  24           19.51
    SIGI RIGHT OR AM I RIGHT?             21           17.07
```

Table S22

1ST CHOICE OCCUPATION IN STRATEGY -PRE[a] & POST[b] (N= 270 & 263)

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	0	0.00	1	0.38
ADVERTISING COPYWRITER.	2	0.74	2	0.76
AIR COND, REFRIG, & HEAT MECH.	3	1.11	3	1.14
ACCOUNTANT.	4	1.48	2	0.76
AIRCRAFT MECHANIC.	1	0.37	1	0.38
APPLIANCE REPAIR TECHNICIAN.	0	0.00	0	0.00
ARCHITECT.	5	1.85	5	1.90
AUTOMOBILE SALESWORKER.	0	0.00	0	0.00
ARCH. TECH. AND DRAFTSMAN.	0	0.00	0	0.00
AVIONICS TECHNICIAN.	0	0.00	0	0.00
AUTOMOBILE MECHANIC.	0	0.00	0	0.00
ACTUARY.	0	0.00	0	0.00
BROADCAST TECHNICIAN.	1	0.37	1	0.38
BEAUTICIAN.	0	0.00	0	0.00
BOTANIST.	1	0.37	2	0.76
BOOKKEEPER.	0	0.00	0	0.00
BUSINESS MACHINE REPAIR TECH.	0	0.00	0	0.00
BANK OFFICER.	5	1.85	4	1.52
BANK TELLER.	0	0.00	2	0.76
COMMERCIAL ARTIST.	2	0.74	2	0.76
CLOTHING DESIGNER.	3	1.11	3	1.14
CHEMICAL ENGINEER.	0	0.00	0	0.00
CHEMIST.	1	0.37	0	0.00
CLERGY.	0	0.00	0	0.00
COMPUTER OPERATOR.	1	0.37	1	0.38
COMPUTER PROGRAMMER.	3	1.11	2	0.76
CIVIL ENGINEER.	1	0.37	6	2.28
DENTAL ASSISTANT	1	0.37	0	0.00
DENTIST	3	1.11	3	1.14
DENTAL HYGIENIST	5	1.85	3	1.14
DRAFTSMAN	1	0.37	1	0.38
DIETITIAN	2	0.74	1	0.38
DIESEL MECHANIC	0	0.00	0	0.00
DANCER AND DANCING TEACHER	0	0.00	0	0.00
ECONOMIST	0	0.00	0	0.00
ELECTRICAL ENGINEER	3	1.11	2	0.76
ENGINEERING TECHNICIAN	2	0.74	1	0.38
ELECTRONICS TECHNICIAN	3	1.11	3	1.14
FINE ARTIST/PRIVATE ART TEACHER	0	0.00	0	0.00
FUNERAL DIRECTOR	0	0.00	0	0.00
FLIGHT ENGINEER	0	0.00	1	0.38
FLIGHT ATTENDANT	2	0.74	0	0.00
FORESTER	6	2.22	5	1.90
GEOGRAPHER	0	0.00	0	0.00
HOME ECONOMIST	0	0.00	1	0.38
HOTEL/MOTEL MANAGER	0	0.00	1	0.38
INSURANCE AGENT	0	0.00	0	0.00
INTERIOR DESIGNER/DECORATOR	0	0.00	0	0.00
INDUSTRIAL ENGINEER	2	0.74	2	0.76
INDUSTRIAL TRAFFIC MANAGER	0	0.00	0	0.00
INDUSTRIAL DESIGNER	1	0.37	1	0.38
INSTRUMENT REPAIR TECHNICIAN	0	0.00	0	0.00
SCIENCE LAB TECHNICIAN	0	0.00	1	0.38
LIBRARIAN	0	0.00	0	0.00
LABOR RELATIONS SPECIALIST	1	0.37	1	0.38
LIBRARY TECHNICIAN	0	0.00	0	0.00

Table S22 (continued)

LAWYER	9	3.33	11	4.18
MATHEMATICIAN	2	0.74	0	0.00
PHYSICIAN	3	1.11	4	1.52
MECHANICAL ENGINEER	3	1.11	1	0.38
METEOROLOGIST	1	0.37	1	0.38
MEDICAL RECORD ADMINISTRATOR	0	0.00	0	0.00
MEDICAL LAB TECHNICIAN	1	0.37	1	0.38
MODEL	4	1.48	1	0.38
MARKET RESEARCHER	0	0.00	0	0.00
MANUFACTURER'S SALESWORKER.	0	0.00	0	0.00
MEDICAL TECHNOLOGIST.	0	0.00	0	0.00
MUSICIAN/MUSIC TEACHER.	6	2.22	4	1.52
MACHINIST.	0	0.00	0	0.00
NURSERYMAN/LANDSCAPER.	1	0.37	1	0.38
NEWSPAPER REPORTER.	6	2.22	5	1.90
OCEANOGRAPHER.	2	0.74	4	1.52
OPTICIAN.	1	0.37	0	0.00
OCCUPATIONAL THERAPIST.	3	1.11	4	1.52
PURCHASING AGENT.	3	1.11	3	1.14
POLICE OFFICER.	2	0.74	2	0.76
PUBLIC HEALTH SPECIALITST.	1	0.37	1	0.38
PILOT.	3	1.11	1	0.38
POLITICAL SCIENTIST.	2	0.74	2	0.76
PHARMACIST.	2	0.74	1	0.38
NURSE, PRACTICAL.	4	1.48	3	1.14
PHOTOGRAPHER.	5	1.85	5	1.90
PUBLIC RELATIONS WORKER.	2	0.74	0	0.00
PHYSICIST.	1	0.37	0	0.00
PHYSICAL THERAPIST.	2	0.74	1	0.38
PERSONNEL INTERVIEWER.	0	0.00	1	0.38
PRODUCTION MANAGER.	2	0.74	1	0.38
PSYCHOLOGIST.	4	1.48	5	1.90
RADIO/TV ANNOUNCER.	0	0.00	1	0.38
REHABILITATION COUNSELOR.	3	1.11	9	3.42
RECEPTIONIST.	0	0.00	0	0.00
REAL ESTATE AGENT	1	0.37	1	0.38
NURSE, REGISTERED.	8	2.96	5	1.90
RESPIRATORY THERAPIST.	3	1.11	3	1.14
RETAIL STORE MANAGER.	1	0.37	2	0.76
RADIO/TV SERVICE TECHNICIAN.	1	0.37	0	0.00
RECREATION WORKER.	2	0.74	1	0.38
SYSTEMS ANALYST	1	0.37	1	0.38
SOIL CONSERVATIONIST.	2	0.74	4	1.52
SECURITIES BROKER.	3	1.11	1	0.38
SECRETARY.	6	2.22	7	2.66
SCHOOL COUNSELOR.	10	3.70	12	4.56
STATISTICIAN.	0	0.00	0	0.00
SOCIAL SERVICE AIDE.	2	0.74	1	0.38
SPEECH PATHOLOGIST/AUDIOLOGIST.	1	0.37	0	0.00
SINGER AND SINGING TEACHER.	0	0.00	0	0.00
SURVEYOR.	0	0.00	0	0.00
SOCIAL WORKER.	9	3.33	8	3.04
TEACHER AIDE.	0	0.00	0	0.00
TELEPHONE CRAFTSWORKER.	0	0.00	0	0.00
TOOL AND DIE MAKER.	0	0.00	0	0.00
TEACHER, ELEMENTARY SCHOOL	10	3.70	5	1.90
ZOOLOGIST.	5	1.85	3	1.14
TECHNICAL WRITER.	0	0.00	0	0.00
TYPIST.	0	0.00	0	0.00
URBAN PLANNER.	1	0.37	0	0.00

Table S22 (continued)

VETERINARIAN.	3	1.11	8	3.04
WASTEWATER TREATMENT OPERATOR.	0	0.00	0	0.00
X-RAY TECHNOLOGIST.	0	0.00	0	0.00
TEACHER, ART.	0	0.00	1	0.38
TEACHER, BIOLOGY.	0	0.00	0	0.00
TEACHER, BUSINESS.	1	0.37	1	0.38
TEACHER, ENGLISH/LANG. ARTS.	2	0.74	4	1.52
TEACHER, FOREIGN LANGUAGE.	1	0.37	1	0.38
TEACHER, HISTORY/SOCIAL STUDIES.	1	0.37	1	0.38
TEACHER, INDUS. ARTS/VOC.TECH.	1	0.37	2	0.76
TEACHER, MATHEMATICS.	1	0.37	3	1.14
TEACHER, PHYSICAL EDUCATION.	4	1.48	5	1.90
TEACHER, PHYSICAL SCIENCE.	0	0.00	1	0.38
WELDER.	0	0.00	0	0.00
AEROSPACE ENGINEER.	2	0.74	3	1.14
FIREFIGHTER.	0	0.00	0	0.00
KEYPUNCH OPERATOR.	1	0.37	1	0.38
LANDSCAPE ARCHITECT.	1	0.37	2	0.76
OPERATING ROOM TECHNICIAN.	2	0.74	0	0.00
OPTOMETRIST.	2	0.74	4	1.52
TEACHER, EARLY CHILDHOOD.	5	1.85	5	1.90
TEACHER, SPECIAL EDUCATION.	7	2.59	6	2.28
CONSTRUCTION INSPECTOR.	0	0.00	0	0.00
CORRECTION OFFICER.	2	0.74	1	0.38
GEOLOGIST.	0	0.00	0	0.00
HOSPITAL ADMINISTRATOR.	0	0.00	0	0.00
PHYSICIAN'S ASSISTANT.	5	1.85	4	1.52
STENOGRAPHER.	0	0.00	0	0.00
EEG TECHNOLOGIST.	0	0.00	1	0.38
NURSING ASSISTANT.	0	0.00	0	0.00
FLORIST (RETAIL & DESIGNER).	1	0.37	0	0.00
TEACHER, VOCATIONAL/TECHNICAL.	0	0.00	0	0.00
CHEF/COOK.	0	0.00	1	0.38
PLUMBER.	0	0.00	0	0.00
FOOD SCIENTIST/TECHNOLOGIST.	1	0.37	1	0.38
TELEVISION PRODUCER/DIRECTOR.	2	0.74	2	0.76
INTERPRETER/TRANSLATOR.	2	0.74	3	1.14
LEGAL ASSISTANT.	12	4.44	10	3.80
FARMER/FARM MANAGER.	2	0.74	2	0.76

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[a] "Pre" (first two columns) means first choice before the student received information about the rewards and risks associated with the occupation.

[b] "Post" (third and fourth columns) means first choice after receiving information about rewards and risks.

Table S23

Designation of First-Choice Occupations in Strategy with Respect to Desirability Sums and Estimated Chances for Entry

DESIRABILITY OUTCOME (N = 268)	FREQ	%
OCCUPATION WITH THE HIGHEST SUM.	94	35.07
WITHIN 10 POINTS OF THE HIGHEST.	49	18.28
MORE THAN 10 POINTS BELOW HIGHEST.	125	46.64
WHICH STRATEGY (N = 264)	**FREQ**	**%**
SUM HIGH;[a] CHANCES HIGH.	93	35.23
SUM HIGH;[a] CHANCES LOW.[b]	68	25.76
SUM LOW;[c] CHANCES HIGH.	55	20.83
SUM LOW;[c] CHANCES LOW.[b]	24	9.09
SUM HIGH;[a] CHANCES EQUAL.	14	5.30
SUM LOW;[c] CHANCES EQUAL.	10	3.79

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[a] *Sum High* means that the occupation had the highest Desirability Sum or came within 10 points of the highest sum.

[b] *Chances Low* means "chances not high"; i.e., the student estimated better chances for some other occupation in the set of three. *Low* does not necessarily mean *lowest*.

[c] *Sum Low* means that the Desirability Sum was not the highest or within 10 points of the highest. It does not mean that the Desirability Sum was necessarily the lowest of the three sums under consideration.

CHAPTER VIII

FINDINGS AT EASTFIELD COLLEGE

Description of College, Computer Configuration, and Career Counseling Services

Eastfield College, in Mesquite, Texas, is part of the Dallas County Community College District. There are four community colleges in the district; eventually there will be seven. Approximately 7,600 students attend Eastfield.

Computer Configuration

In the fall of 1976, when the evaluation visit was made, one SIGI terminal was in use at Eastfield. The terminal and the computer were placed in the counseling office on the second floor of the student center, where they had high visibility. The counseling center is a large area with a balcony overlooking the cafeteria and with offices for individual counselors surrounding the open area. The terminal was at the back of the reception area behind the desk where a paraprofessional scheduled students for SIGI and helped them with its operation if they required assistance. The terminal was not otherwise screened from the traffic in the room and students had little privacy. A second terminal was installed in the counseling office after the evaluation team had visited Eastfield.

The SIGI software was installed in March 1975. SIGI was run on a PDP 11/40 based RSTS/E system which had 48K words of core memory and three RK05 1.2-million-byte cartridge disk drives. The terminals, Delta Data 5000's, were connected directly to the computer through DL11 single line interfaces and were equipped with 30-character-per-second Texas Instrument printers. The computer also had one dial-up port which was occasionally used by ETS for trouble shooting the Eastfield system.

The RSTS system was operated by the Director of the Appraisal Center, a former counselor with a strong interest in computers. The computer was used exclusively for SIGI.

How reliable is this hardware configuration? To find out, we asked the test sites to keep two logs from September 1 to December 1, 1976, one by the computer operators and the other by the SIGI monitors, describing each hardware problem and, if possible, identifying its source. The logs of the computer operators were sent to ETS every time there was a problem; the logs of the SIGI monitors were collected at the end of the test period.

During the time the logs were kept there were no problems beyond what might be expected in any computer system the size of SIGI. All the components are standard, off-the-shelf equipment requiring no modification for SIGI. Problems were taken care of by means of routine service procedures.

The initial SIGI installation went very smoothly. There were some problems in the first year with the Delta Data terminals which were taken care of with the installation of heavier power supply units. Since then, there have only been minor problems with the computer system.

Career Counseling Services

Description of Counseling Department. Eastfield's counseling staff consists of 11 full-time professional counselors who handle personal, vocational, and academic counseling and who administer personality, interest, and ability inventories to students as requested or needed. (There is no mandatory testing program at the college.) In addition, they conduct informal group counseling sessions that are open to all students and that cover a variety of problems, including career choice. Six full-time paraprofessionals assist the professional staff with academic counseling.

A SIGI workshop was held for counselors in November 1975. A member of the SIGI staff explained the theory behind SIGI, answered counselors' questions, and addressed their concerns.

Role of SIGI in the Counseling Program. SIGI was not used as a component of any formal instructional program. Rather, it was publicized through posters, local newspapers, an interdistrict newsletter distributed to the four campuses of the Dallas Community College District, and during orientation, and students were invited to sign up for use of the terminal on a first-come, first-served basis. Students with problems related to career choice were referred to SIGI by counselors or advisers whom they had seen individually. Also, counselors who conducted the informal group counseling sessions that were devoted to career choice suggested the use of SIGI to the students in their groups. Students referred by counselors were not given preferential access to the terminal. Thus students who need career guidance can turn to counselors, paraprofessionals, SIGI, group discussions (usually in a series of six sessions), or a combination of these. In addition, Eastfield has a small career reference library that includes basic references on occupations and career planning, as well as information about local employment opportunities.

The Dean of Instructional Services and the Director of Counseling oversee the operation of SIGI at Eastfield. Assisting them is a team of 12 part-time paraprofessional counselors who share responsibility for scheduling students on the terminal, assisting them, answering their questions, and administering questionnaires for both the ETS and the local evaluation of SIGI. The part-time paraprofessionals are, for the most part, mature women returning to work or school or both. They have other duties in the counseling center besides the management of SIGI. Their work is coordinated by a counselor.

At the time of the site visit in the fall of 1976, about 40 students per week were using one terminal from 8:30 a.m. to 8:30 p.m. Monday through Thursday and from 8:30 a.m. to 4:30 p.m. on Friday. The average appointment was for one and one-half hours, and most students completed their use of SIGI as novices in one or two sessions. Because Eastfield had only one terminal, students often had to wait a month or more for their appointments. The arrival of a second terminal after the site visit reduced waiting time.

After students had completed SIGI, they were asked to fill out questionnaires for the college's assessment of the system. For the most part, students did not see counselors for a post-SIGI conference even though counselors usually suggested such a meeting to them.

Impact on Students

To measure the impact of SIGI on its users, we interviewed a few students at each college who had gone through SIGI and we had questionnaires administered to a sample of SIGI users (experimentals) and a sample of students who had not used SIGI (controls). The colleges selected the students to the extent possible. (See Appendix D, letter to the college.) This section of this chapter discusses our findings from these two instruments at Eastfield College.

Most of the interview students selected by Eastfield had used SIGI several months before our evaluation visit and had trouble recalling the details of their SIGI experience. Furthermore, the Prediction and local Planning systems had been in use for only a short time, and few students had used them. We consequently decided to limit our interviews to 10 students and to use the extra time to talk with counselors about the effect of SIGI on their counseling practices.

As to the questionnaires, our guidelines asked that the controls be selected from the population of students who were interested in using SIGI but had not yet been scheduled to do so. Eastfield was not able to follow this guideline. The college had not been running the complete SIGI for very long; and, since only one terminal was then in use, there was not enough time for a large number of potential users to accumulate. Eastfield therefore administered the control questionnaire to students who were at the college for freshman orientation. The result was that the controls were distributed differently from the experimentals with respect to age and enrollment status. These differences may have introduced bias into some findings.

Interviews

Sally. Sally was 28 years old. She was a high school dropout who had become a secretary, had married, and had spent the previous four years bearing and raising a daughter, now three years old. Her problems with career choice were complicated by the fact that she had a felony record, which restricts the range of opportunities open to her. Nevertheless, she had earned her high school equivalency (GED) and was "sponsored" for two years of education, which she was undertaking at Eastfield. According to her self-estimates in Prediction, she had always been first or second in her class, depending on whether or not mathematics was involved in her coursework. She impressed her interviewer as being both quick and articulate.

Before going on SIGI, Sally had in mind a career as a social service aide, an occupation she had been thinking about for almost a year. Her reason was that she wanted to "help people in jails or prisons." She was uncertain about her values, however, and a counselor had suggested that she use SIGI to clarify them. In explaining her concern, she said, "I want to be sure of what I'm doing. I don't want to spend a lot of time in school and then come out and not like what I'm doing."

The Values system was fascinating to her. She told the interviewer, "It really made me think and I've thought about my values even more since then and what I want to do." When she was first weighting her values, she realized that independence was very important to her, but later in summing her weights to 40 she became confused between independence in performing her work and the independence she could attain as a result of being employed and having her own money. She resolved the confusion, however, and was able to understand that the value Independence in SIGI is independence on the job. After completing SIGI, she expressed an interest in going back to Values to see if she would like to change her weights.

Sally was pleased with the occupations that came up in Locate. Although Social Service Aide was not among them, Rehabilitation Counselor was. She recognized it immediately as important to her. She described her reaction as follows:

> I just grinned to myself when I saw it come up on the screen because I knew that was what I'd really like to be. . . . I was just thrilled that it [SIGI] came up with something I wanted to do that much without my having given it any information besides my values.

The other occupations on her list--several teaching occupations, Clergy, and Lawyer--also seemed logical to her because they were helping occupations.

In Compare, Sally explored Rehabilitation Counselor, Social Worker, and Social Service Aide. She learned that the amount of education (a master's degree) required for her to become a Rehabilitation Counselor was more than she could manage in her present circumstances, for she could "only count on two years." She asked almost all the Compare questions for the three occupations. She found out that the reason why Social Worker and Social Service Aide had not appeared in Locate was that the latter works under close supervision and the former does not have so much independence as a Rehabilitation Counselor. The only information she would have liked from Compare but could not get was the effect of a criminal record on employment opportunities.

In Prediction Sally asked about Sociology and was "relieved" to find that she had 15 chances in 100 for an A or B and "good" chances for a C or better. She had rated herself low on memorization because she had been out of school for so long and was not sure of herself, but she rated herself high on the grade factor Interest in Sociology. She estimated her rank in class as in the first or second fifth. She thought that she had consistently ranked first in her class from the fourth grade until she had dropped out in her senior year, except when mathematics was involved.

Since Sally had extensively gone over possible courses for Social Service Aide with her counselor before using SIGI, she used the Planning system only briefly. She did not say whether or not she had checked the Planning system for information about Rehabilitation Counselor.

Strategy, although irritating to her at first, helped to confirm her choice of Social Service Aide for the next two years. She said:

> I was irritated because I knew what I wanted to do [rehabilitation counseling], but I had to be practical about it. . . . I am sponsored for two years and I can't look beyond that. . . . Actually, I felt better when the computer said, "Yes, you have to be practical."

Sally's experience is illuminating. She entered SIGI apparently well settled in her choice of occupation for reasons associated with an important value, her desire to help others entangled in the penal system, and she was safely enrolled in an appropriate program. One would hardly think that she needed career guidance, whatever her personal problems might be. But she felt that something was missing. SIGI taught her to make these vague feelings explicit. She began to organize her thinking around her values, discovered an occupation that pleased her for reasons she understood, and examined it in a logical manner to see if it lay within reach of her abilities and resources. She is realistic about her chances of entering the occupation, and she has sensibly adopted a strategy that will take care of her immediate needs while she searches for paths to her primary goal. This is rational decision-making.

Other interviews. Most of the nine other students selected for interview also happened to be older women returning to college in search of a career. The months that had passed since they used SIGI had erased many of the details of their experience. What remained was a dominant impression of the system. This impression gave us some insights into the continuing effects of SIGI.

All the users were positive in their comments about SIGI. In general, the aspect they remembered as having been most useful was the amount of information it made available to them. One woman said, "SIGI's strongest point is all the information it lists." Another said, "I would have liked answers to all the questions." A third commented, "SIGI played a role in my choice by answering all those questions." And a fourth said, "The information was useful. I can't remember the details, but I have the printouts if I want to look back."

Besides supplying information, SIGI helped these users in specific choices. One was confirmed in her choice of accountant. She said, "I had already been thinking of accounting, but when I went on SIGI I found out how much money you make and what kind of math you need. Before, I really didn't know." Another had discovered an occupation, actuary, that she had not thought of before. Yet another changed her career goal from history teacher to physical therapist. Two women who had been interested in law had a delayed reaction from their SIGI experience. They remembered that Urban Planner had come up in Locate, and at the time of the interview they were considering that occupation.

When asked about the Values system, all of the students said they were grateful for the opportunity to clarify their values. They had not previously recognized the role of values in decision-making. One said, "I didn't know what values were important before I went on that." Another realized that the values clarification had given her a logical method for making a decision about her career. She observed:

> It made me clear on the law thing. It helped me when I had to sum to 40. It made me think out what I had to do. I had to decide on which one was important, and that was something I never had to do before. I had to decide between Income and Leisure.

Experimental and Control Group Questionnaires

Method of analysis. Separate questionnaires were given to students who had been through SIGI (experimentals) and to students who were scheduled to use SIGI but who had not actually used it (controls). This section of the report covers the responses of Eastfield students to the questionnaires. Since questions 1-41 are the same for experimentals and controls, we were able to run tests of significance comparing the responses of the two groups and to present the 41 questions, together with our findings, in a single table, E1. The portions of the questionnaires that are different are in separate tables: questions 42-45 for controls in Table E4 and questions 42-88 for experimentals in Table E5. (The intact questionnaires are in Appendix D.) In all cases the numbers in the tables are percentages unless otherwise indicated.

In the tests of significance, chi-squares were computed for most questions (1-24 and 37-41). In the computation, responses in logically related categories were grouped if the expected cell sizes fell below 5; this is a requirement for chi-square. For questions 25-29, in which students used scales to rate themselves on a variety of dimensions, *t*-tests were done on the computed group means. Questions 31-34 comprise an information test. Wrong answers for each question were scored 1 and correct answers 2. The four scores were then added and an information test score group mean was computed. It is shown opposite question 30 in Table E1. A *t*-test was then done on the two means. In reporting the results of all tests of singificance, we follow the convention of using a single asterisk for significance at the .05 level and double asterisks for the .01 level.

Several of the questions are open-ended. Responses to these have been placed in separate tables. Tables E2 and E3 list the occupations named by experimental and control students in response to question 30 (What occupation would you like to prepare yourself for eventually?) The responses have been grouped according to whether or not the occupation named was among those already in SIGI. Other responses that could not be quantified appear in Tables E4A, E6, and E7.

Results. Questions 1-3 give a description of the sample in terms of age, sex, and college enrollment. The experimental and control groups differed significantly in age and year in college ($p < .01$). A larger percentage of the controls were 15-22 years old while a larger percentage of the experimentals were over 30. The majority of controls were in their first year of college, while most experimentals were in their second year. Only 22% of the experimentals were freshmen, compared to 52% of the controls. In both groups, slightly more than half of the students were women.

Questions 4-10 concern students' assessment of their career decision-making skills. Significant differences were found in three of the seven questions: The experimental group (SIGI users) had explored more occupations than non-users (question 5) and had more specific career plans (question 9)--for both, $p < .01$. Moreover, the experimentals were more confident ($p < .05$) in their ability to predict grades. The groups were not significantly different in knowledge of rewards and satisfactions to be obtained from an occupation (question 4), the number of occupations that students thought would provide desired satisfactions (question 6), and overall confidence in career decision-making skills (question 10). Although experimentals had more specific career plans, there was no significant difference between groups on how definite those plans were (question 7).

Insert Table E1 about here

Questions 11-18 investigated activities related to career exploration. Significant differences were found in response to two of the questions. As expected, more experimentals ($p < .01$) had used "a computer-based guidance system" (question 18). Experimentals also had used the career reference library more frequently ($p < .05$) than controls (question 14). Otherwise, the groups did not differ statistically: No differences were found in the level of activity in reading about occupations (question 11), talking with friends about careers (question 12), talking with people in the field (question 13), attending career planning workshops (question 15), talking to a guidance counselor about careers (question 16), or using career-related audiovisual materials (question 17).

Given the opportunity to agree or disagree with certain statements about choosing an occupation, students who had used SIGI felt significantly ($p < .01$) less need to know marriage plans before planning a career (question 23). No significant differences were found in the attitudes of the two groups toward following the advice of others, toward the role of chance in career choice, toward conflicting advice from others, toward making their own decisions, or toward the need for making an immediate choice (questions 19, 20, 21, 22, and 24).

Questions 25 through 29 explored the way students rated themselves as career decision-makers. No significant differences were found between the self-ratings of the two groups for any of these questions which dealt with ability to make career decisions, knowledge of occupations, how often students planned ahead, confidence in their decisions, and knowledge of goals and values.

As a check on these self-ratings, four questions were included to test the students' actual knowledge of occupations (questions 30-34). Students were asked to name a first-choice occupation (question 30) and were questioned about the education required, average salary, amount of independence, and employment outlook for that occupation. Tables E2 and E3 list the occupations named by the two groups of Eastfield students. They show that most of the occupations of interest to both groups are already offered by SIGI. First-choice occupations named by 48 of the 63 students in the experimental group and by 85 of the 128 students in the control group were SIGI occupations. A few students in both groups named identifiable occupations not in SIGI. The rest--11 students in the experimental group and 31 in the control--were unable to name a specific occupation or were undecided.

Insert Tables E2 and E3 about here

The replies to question 30 were sometimes difficult to tabulate because students often were unable to identify a specific occupation or to express clearly what they had in mind. We sometimes had to make judgements about a student's meaning. When the staff could not reach agreement, they recorded the answer as Too Vague to Classify. When the occupation named in question 30 was a SIGI occupation, we were in a position to evaluate the accuracy of the students' responses to questions 31-34 for both groups. These four questions constitute an information test, which was scored in the manner described earlier. The students who had used SIGI were found to be significantly better informed ($\underline{p} < .05$).

Responses to questions 37-41 show that the two groups were similar in their career guidance experiences (excluding SIGI) at Eastfield. More than 40% of both groups had seen a counselor within the last two months (question 37) about a variety of problems (question 38). More than three-fourths of the experimentals and controls said they had not taken a career guidance course (question 39). Although Eastfield does not have a formal course in career guidance, counselors at the college do conduct informal group counseling sessions which address career choice. Both experimentals and controls were about equally satisfied with these sessions (question 40). Generally, neither group had reservations about interacting with a computer for career guidance (question 41).

The remaining four questions in the questionnaire for the control group explored attitudes toward SIGI. They are listed in Table E4. Sixty-six percent of the group had heard of SIGI (question 42) and 75% wanted to use it (question 45). Only one student had formed an unfavorable impression of it (question 43). Members of the group had learned about it from a variety of sources (question 44). It may be noted that many students who, in question 42, said they were unaware of SIGI's existence went ahead anyway and answered questions 43-45. Such are the vagaries of questionnaires. We assume that the 75% who responded yes to question 45 represent students who felt a need for career guidance.

Table E4A lists the responses of the control group to the open-ended questions.

Insert Tables E4 and E4A about here

The remaining 46 questions in the questionnaire for the experimental group sought to find out how these SIGI users rated their experience with SIGI (Table E5).

When asked to give SIGI a grade (questions 42-54), more than 75% of the students graded SIGI A or B for 6 of the 13 items (interest, clarity, overall usefulness, helping with values awareness, seeing relationships between values and career decisions, and getting information). For six of the remaining seven questions, which concern choice of an occupation, finding occupations to fit values, understanding predictions, estimating probabilities of success, helping to plan a program appropriate for an occupation, and learning to make career decisions, the proportion of A's and B's was over 50%.

Insert Table E5 about here

As for their experience with SIGI (question 55), 44% said that SIGI helped confirm a choice they had already made, 7% said that SIGI helped them to choose an occupation, and 31% thought that SIGI had suggested other occupations worth considering. Eighteen percent failed to perceive SIGI as having been directly helpful.

Questions 56-63 asked the experimental students whether they would consult SIGI, a counselor, or a combination of the two for help with occupational and educational decisions. The students would tend to choose the combination for most guidance purposes. This preference held true for planning a program of study, getting information about an occupation, confirming an occupational choice, resolving conflicts about occupational choice, and estimating chances of success in a program. SIGI alone was preferred by 57% of the sample for finding occupations that fit values and, by 50% of the sample, for making values more clear. Sixty-nine percent thought a counselor alone would be more help in finding out about financial aid.

Over half of the students who had used SIGI planned to schedule a conference with a counselor for a variety of purposes (questions 64 and 65). Other purposes were mentioned by three students (see Table E6, question 65).

Over two-thirds of the students (67%) said that the occupations in which they were interested were actually retrieved on the basis of their values in Locate (question 66). Although they named a few occupations as "missing" from SIGI (Table E6, question 67), the "occupations" they named were often not occupations at all, but general fields of interest; some were already in SIGI; some were specialties of occupations in SIGI; and some were occupations with only small numbers of workers. A few students mentioned occupations that are scheduled to be added to SIGI in the next round of additions (park ranger, travel agent, bilingual teacher). About 63% regarded the information in SIGI as superior to other sources of occupational information (question 68).

Insert Table E6 about here

Of the Eastfield students who had used SIGI, 84% were satisfied with the 28 questions made available in Compare (question 69). Although ten students suggested additions, only six of those were specific, and they would be hard to implement given the present nature of occupational information that is available. The questions suggested for addition are recorded in Table E6.

Regarding SIGI's style and vocabulary (question 70), 3% said that they were too difficult while 90% found them to be "just right." Since the reading level of the text was designed for community college students, this finding is particularly encouraging.

Only one student detected any bias in SIGI (question 71): He thought that there was "a definite undergraduate bias."

One hundred six responses were made to question 72, asking about problems that might have occurred in using a computer-based system. Twenty percent reported that they had to wait too long for a SIGI appointment; 19% said they felt rushed while using SIGI; 10% did not understand some of the directions; 9% thought there was too much reading. Eight percent reported that the writing on the screen caused eyestrain, that the computer had breakdowns, and that they wanted to sign off SIGI, but couldn't. Two percent said the writing on the screen was jumbled. A variety of other irritations were mentioned by 14% of the students who checked "Other," such as inability to go back to correct mistakes or redundancies in the text (Table E6, question 72).

Almost three-fourths of the SIGI users frequently took advantage of the opportunity to get printouts, and only 8% used the printer just once or twice (question 73). Over two-thirds (68%) tried to get more information on their own initiative after using SIGI (questions 74 and 75). The majority (63%) of the students spent between two and four hours on SIGI, and 17% spent more (question 76). Eighty-four percent of those in the sample had gone all the way through SIGI, including Strategy, at least once, usually in one or two sessions (questions 77 and 78). More than half (52%) expressed an interest in securing additional time on SIGI (questions 79 and 80).

The six subsystems of SIGI seemed to meet a variety of different needs; every section would be "used most" by at least some students, although Planning and Compare received the largest percentages of votes (24% and 20%, respectively). Locate was the system named least often (question 81).

Students found SIGI to be comprehensive; 80% said that there was nothing more they would like it to cover (question 82). A few wrote in suggestions for improvement, such as providing information for those changing occupations, adding more information about local job search, and so on (Table E6, question 82). Nearly three-fourths (73%) said that there was no area that needed fuller coverage (question 83), but the others would have liked more complete or detailed occupational information, more information on courses within a field of study, and similar additions (Table E6, question 83). All areas except Prediction were liked best by some students; getting occupational information was the most popular, designated best by 31% of the group. The privacy that SIGI makes possible was considered very important to 23% of the group, but it made no difference to 36% (question 85). Seventy-one percent of the group said that they had advised their college classmates to use SIGI, of these, over half (62%) had recommended it to three or more friends (questions 86 and 87).

Question 88 asked the students for suggestions for improving SIGI. The answers are listed in Table E7. Most of the suggestions were for expansion of the information or services offered by SIGI or for minor changes to enable students to move more quickly to the sections in which they were most interested. There were a few suggestions that revealed insufficient information on the part of the student. The general tone, however, was one of approval, respect, and gratitude.

Insert Table E7 about here

Impact on Counseling

Questionnaires

Responses of six Eastfield College counselors who filled out questionnaires are tabulated in Table E8. (The constructed responses to the open-ended questions on that instrument are in Table E9.) One of the six had never attended a SIGI workshop.

The counselors were in general favorably disposed toward the idea of computer-based guidance (questions 4-8). None of the counselors saw computer-based guidance as a potential threat (question 6), four of them planned to use such a system in their counseling (question 7), and all six had actually referred students to SIGI (question 12). Five of the counselors who had used SIGI and had observed SIGI students thought that those students reacted favorably to SIGI (question 13) and benefited in a number of ways (question 28). Three out of four thought that the reading level of SIGI was appropriate for their students (question 32); half of them believed that the occupational information was better than other sources available (question 33); and all six thought that SIGI was free from any kind of bias (question 34). Interpretation of the students' printouts was not a problem. Only four counselors, however, said that students came to them with printouts (question 14), and one counselor said separately that he or she was structuring counseling sessions to take advantage of printouts (see Table E9). Only three counselors said that students had encountered problems with the terminals (question 15): One noted that students wanted a simpler way to select occupations for examination in Compare, and two mentioned problems with hardware (Table E9).

Questions 16-23 were designed to explore the effect SIGI might have on problems that counselors face in career guidance. The chief problems were keeping up to date with occupational information and identifying students who need help; the most frequently specified minor problems were getting students to read occupational information, identifying sources of information, and selecting appropriate programs for students' goals. Each problem was designated by at least one of the counselors as having felt the impact of SIGI. SIGI was seen to have had its greatest effect on getting students to read occupational information and on helping counselors keep up to date on occupational information.

Insert Table E8 about here

Five counselors responded to questions 24-27, which explore the impact that SIGI may have exerted on counseling sessions. Of the four of these who had had opportunity to observe, none thought that SIGI had affected the number of students they could see; four thought the amount of time they spent in career counseling had increased; none saw that the length of counseling sessions had changed; and two thought the quality of their discussions about values and career decisions had improved, whereas the other two saw no change.

Question 28 sought to discover how SIGI had affected the behavior of students' career decision-making behaviors that might be observed in counseling sessions. In the opinion of the five counselors in a position to know, the SIGI students clearly rated higher than non-SIGI students in all seven categories of behavior.

Question 29 explored the subject of how SIGI should be fitted into the structure of the counseling department. Three counselors accepted the idea of making SIGI available to students on an entirely ad lib basis with no counselor intervention or mandatory follow-up. All the other 10 responses favored a structure in which the counselor would play a direct role in the career guidance process. Counselor referral to SIGI with mandatory follow-up was the structure named most frequently--five times. No counselor suggested an alternative configuration.

Counselors named few occupations or occupational areas that they or their students would have liked to see in SIGI (questions 30 and 31). (Medical Technology and some other medical occupations are already in SIGI.) One counselor said that deaf students had problems with SIGI's vocabulary and style, and another said that the "small print and technical nature of the material" made SIGI "unusable for some students." Four counselors suggested improvements for SIGI (question 35). These and comments volunteered under "Optional Information" are listed in Table E9.

Insert Table E9 about here

Interviews

Curtailment of our interviews with students allowed us to talk with four of the Eastfield counselors about their impressions of SIGI and the way it has affected their work.

The impact has been good. One counselor described it as "totally good." "It is pushing counselors to go beyond where they were before," he said. The counselors reported that at first there had been some apprehension about SIGI, but this had evaporated as more and more students used the system. "It has desensitized us to using the computer," one of them said. Another observed, "SIGI has given us new approaches and new terminology, and we, in turn, have expanded on SIGI."

The presence of SIGI has affected what goes on in a counseling session. One counselor described the change as follows:

> Students now come to us further along in the problem-solving process. We used to make assessments of students, give them batteries of tests, personality and interest inventories, and then try to suggest some occupations to start. All that is covered in SIGI now, and we spend less time in testing.

In interacting with students, counselors have found that SIGI has "clarified" their thoughts. Some counselors had never organized counseling around Values before. Now they have a terminology that gives them a common framework. They sometimes even use SIGI "as a springboard for discussing lifestyles outside of occupations."

Students who have been on SIGI often seek counselors for additional help. About half of the students bring their printouts. They come for a variety of reasons. Some want more information about a specific occupation, some need help in making a final decision, and some need help in discussing their goals. Occasionally there is, in the words of one counselor, a "reality discrepancy: Their goals and abilities may be 180 degrees apart." The counselors recognize that SIGI raises questions as well as answers them. "There is more depth to counseling than what appears on the screen," one of them said, and added that, because of SIGI, counselors can now grapple with those questions and do more counseling in depth. One counselor in particular thought that students react to SIGI in different ways and that some of them needed outside help. They sometimes disagree with the definitions of the ten values as they appear in SIGI, do not know which of the six interest fields to specify, or are apprehensive about their predictions. Another counselor pointed out that older students often wanted more specialized information than SIGI offered--local data, for example, or information about highly individualized occupations. In each case SIGI provided a point of departure for discussion of these topics.

Usage of the System

The computer automatically records the responses that students make to most displays. Tables E10-E23 represent these summary data on students who used SIGI at Eastfield College. The _n_'s vary from table to table, with higher frequencies in Values, Locate, and Compare, which novices encounter first, and lower frequencies in Prediction and Strategy, which novices encounter last. The reasons for the decrease cannot be isolated. The main reason, however, appears to be that Eastfield has made SIGI available to large numbers of visitors and students from other colleges who are able to use the system for only a short time and never finish, thus increasing the amount of use at the front end, especially Values and Locate. In any case, the reader should bear in mind that the summary data do not indicate the progress through SIGI of a particular group of students. They are merely a record of responses over a period of time. Some of the students were already in Planning or Strategy when the data collection began, and others were just beginning when the disk was swept clean of the accumulated data. Thus the tables are to some extent independent of one another. Nevertheless, the _n_'s are sufficiently large to reflect the way SIGI was used.

Data from the SIGI Introductory Sequence

Breakdown of the sample. Table E10 shows the breakdown of this sample by age, sex, and enrollment status. Percentages are given rather than actual numbers because students are asked about their age and enrollment status every time they sign on, since these variables may have changed between sessions.

We see that approximately 40% of "sign ons" were 18 or under--that is, they were students who had presumably gone directly to college from high school; consequently, there were proportionately fewer "older students."

The sample contained equal numbers of women and men. Only about 10% of the sample had had no college experience.

Insert Table E10 about here

Initial status with respect to career decisions. On their first pass through the introductory sequence, students respond to questions about their awareness of their occupational values, about their identification of occupations that fit their values, about their ability to predict their grades, and about their knowledge of appropriate programs to enroll in. Table E11 gives the distribution of their responses to these questions. The table reflects the state of mind of students as they begin their interaction with SIGI. We may make the following observations:

Insert Table E11 about here

1. A quarter of the students in the sample said they knew their values, and about half of them had a general idea of what they want from an occupation but had not analyzed their values ("Values Status").

2. They tended to feel a need for much information about which occupations fit their values.

3. Thirty-eight percent of the students in the sample believed that they could predict their grades successfully in at least some programs, and the same percentage believed that they could predit their grades successfully in any program.

4. Most of them had little or no idea what program to enroll in and would like help in planning.

Data from the Values System

The Values system yields measures showing the importance that students attach to each of the ten occupational values used in SIGI and also indicates the field of interest they would like to work in.

Values weights. Table E12 shows the means and standard deviations of the weights that students assigned to the values on a scale where 0 designates no importance and 8 maximum importance. The figures in the "Unrestricted" column are the weights assigned by students before they played the Values Game--i.e., the numbers represent the students' initial reactions to the definitions of the values. The "Restricted" column reflects the effects of both the Values Game and the constraint that the sum of the weights equal 40. The latter condition, of course, largely accounts for the smaller means in the Restricted column. It is not possible to separate the effects of the Values Game and the restriction to 40 points on all changes from the Unrestricted to the Restricted columns. In general, however, it would not be unreasonable to attribute changes in rank order (Income, Prestige, Helping Others, Security, Variety, and Leisure) primarily to the Values Game.

Insert Table E12 about here

Table E12 shows (a) that each of the values was important to some students; (b) that there was no serious ceiling or floor effect, since even the highest and lowest weighted values exhibited sizable variation; (c) that, in general, Interest Field, Income,and Security were the three most important values for this group, whereas Early Entry was the least important; and (d) that in reaching the 40-point limit, students selectively reduced the weights originally assigned--that is, not all weights were decreased proportionately. Students were least willing to give up Income and Interest Field and were most willing to reduce weights for Prestige and Early Entry.

The low weight given to Early Entry is not surprising, since all the students had already made some commitment to education beyond high school.

It is also interesting to note that the standard deviations show very little reduction. Indeed, one case (Helping Others) shows a slight increase. Thus, the restricted case does not appreciably reduce the variance of the weights.

Selection of interest field. Before weighting the value Interest Field, students indicate which one of the six fields interests them most. They are given the opportunity to change fields before they adjust their weights to sum to 40 and whenever they elect to return to the Values system to review the weights originally assigned.

Table E13 shows the number of times each field was selected. Note that "N = 851" in this table means that 851 interest field selections were made by the sample of students. Some may have chosen the same field more than once, and others may have changed fields.

Insert Table E13 about here

Table E13 shows that the Personal Contact interest field was clearly the most popular, with Verbal in second place. The Technological and Aesthetic fields were least popular.

Data from the Locate System

In Locate, students select a set of five values as a screen for retrieving potentially attractive occupations. The students specify a minimum return they would like on each value, and the computer then lists occupations that meet or exceed that minimum for each of the five values. Although students may choose any five of the ten SIGI values, the students are encouraged to choose their top-weighted ones.

Values selected for the screen. Table E14 shows the frequency with which each of the 10 values was selected as a member of the retrieval set. It may be inferred that students tend to use their most cherished values

Insert Table E14 about here

in Locate, for there is close agreement between the rank order of the value weights (Table E12) and the rank order of the frequencies in Table E14.

Specification levels or categories. For each value except High Income and Interest Field the student may specify one of four possible levels; there are five levels for Income, and there are six categories (not levels) for Interest Field. Table E15 shows the frequency with which the various levels or categories were specified. Again, the *n*'s and the numbers listed in the "FREQ" column indicate the number of times a value or specification was used, not the number of students making the specifications. Also, the numbers are associated only with values/specifications that actually retrieved acceptable lists of occupations. If a student's specifications are too strict or too loose, resulting in empty lists or ones of unwieldy size, he must alter the specifications, one at a time but in any order, until he finally arrives at a set that does retrieve.

Table E15 indicates that all the degrees of specification are used.

Insert Table E15 about here

The fact that the retrieval of an empty list forces the student to lower a specification (or change interest fields) may account for the frequency with which the lowest specification appears. (A value set at the lowest level does not screen, since all occupations meet or exceed that specification.)

Table E15 also shows that students tend to specify mostly average and above average levels, and that when they use Interest Field as one of their search values, the most popular field (Personal Contact) was the one most frequently chosen in the Values system.

Occupations retrieved in Locate. What occupations do these values/ specifications retrieve? Table E16 lists all the occupations in SIGI at the time of the data collection and the frequency with which each was retrieved. The frequencies include the interaction of initiates (students who have gone through the six subsystems in the prescribed order and who are consequently privileged to return to any subsystem) as well as novices.

In all, 142 occupations of the 155 in SIGI were retrieved for a total of 9,723 times. As would be expected from the relative popularity of various levels of specifications, professional occupations were much more frequently retrieved than were nonprofessional occupations. The 13 occupations that were not retrieved are

Insert Table E16 about here

Appliance Repair Technician
Avionics Technician
EEG Technologist
Instrument Repair Technician
Keypunch Operator
Medical Lab Technician
Nursing Assistant
Operating Room Technician
Radio/TV Service Tech
Science Lab Technician
Telephone Craftsworker
Wastewater Treatment Operator
Welder

No occupation appeared more frequently than about 4.4% of the total frequency for novices and initiates. If we pool the various teaching occupations, the most frequently retrieved occupations would be

Teacher
Lawyer
Psychologist
Physician
Rehabilitation Counselor
School Counselor
Dentist
Speech Pathologist
Civil Engineer

Data from the Compare System

Occupations selected for examination. Table E17 shows the frequency with which students (initiates and novices) selected occupations for examination in the Compare system. Students may select any occupations they want, but they are particularly encouraged to investigate occupations retrieved in Locate because those occupations tend to satisfy their values.

There was only one occupation (Appliance Repair Technician) that students never selected. Students did not confine themselves only to occupations retrieved in Locate. For example, Operating Room Technician, which was not retrieved at all in Locate, was selected four times in Compare; Welder, which also failed to appear in Locate, was selected three times. On the other hand, the secondary school teaching occupations, which were among the most frequently retrieved in Locate, were asked about in Compare less than 1% of the time; physical education teacher and history teacher were exceptions. It seems possible that many students tended to avoid the teaching occupations because they knew the job market has turned sour. In general, however, the two sets of frequencies appear to be quite consistent. The occupation most frequently asked about (over 4.8% of the total frequency) was School Counselor. In comparing absolute frequencies of occupations retrieved in Locate with those used in Compare, one must allow for the fact that a given occupation may be retrieved several times by one student through various lists of specifications in Locate, but will probably be selected only once by that student for examination in Compare.

Insert Table E17 about here

Questions for which answers were sought. Students may ask up to 28 questions about the occupations they have selected. (For a list of the questions, see Figure 2, Chapter II.) Table E18 shows the frequency with which each of the questions was asked. All the questions were asked with

Insert Table E18 about here

considerable frequency, the highest being 7.3% of the total. The least favored were "Opportunities for leadership?" and "Prestige level?" The five most often chosen were, in order,

Description of work activities?
Education required--Early Entry?
Definition of occupation?
Beginning salary?
Employment outlook?

Data from the Prediction System

Reports of previous academic performance. Table E19 summarizes students' responses to questions about their previous academic performance. The responses are stored by the computer and may (or may not) be included among the predictor variables in any of the regression equations that compute the probability of a student's receiving various grades in a particular "key course." Table E19 shows that over 75% of the Eastfield College students reported that they had ranked in the second or third fifth of their high school class and that the modal mathematics grades were mostly B's and C's. They presented a somewhat rosier picture with respect to their English

Insert Table E19 about here

grades; more than two-fifths of the students reported that they had earned A's, and more than 80% of them said they had got B or better. On the other hand, only 60% were confident that they needed no help with English and more than a quarter of them (28%) believed positively that they did need help. Perhaps some students did not think that a grade of B or better in high school English guaranteed sufficient mastery for college work.

Programs for which predictions were requested. The list of programs for which the student can obtain predictions is different at each college. At the time of the evaluation, predictions were available in 28 programs at Eastfield College. Table E20 lists these programs and shows the frequency with which each was selected in the Prediction system. Students sought predictions in all the programs. The programs most frequently selected were Business, Law, Sociology, and Computer. The n's were not large and no program was selected more than 24 times.

Insert Table E20 about here

Selection of questions about probability. Also available in the Prediction system are explanations of probability and prediction. The explanations are in the form of answers to five questions that the student (novice or initiate) may ask if he chooses. (See Figure 5, Chapter II for the wording of the questions.) The questions were included in SIGI because we knew from our past experience that the concept of probability is difficult for many students. The frequency with which each question was selected appears in Table E21. Each question was important to some students. Twenty-eight students (assuming that each student asked only one question) sought answers to one or another question. This is over one-third (37%) of the students using the Prediction system, if we assume that the number of students is the same as or close to the number that reported their previous academic performance in Table E19--in the case of Eastfield, 76.

Insert Table E21 about here

Data from the Strategy System

(No summary data are collected from the Planning system. Indeed, the only information from that system that is worth recording as summary data would be the names and frequencies of the occupations selected for planning.)

In Strategy, the student selects a set of three occupations and indicates which one he favors most. Then he sees the Desirability Sums of the occupations. (See Chapter II, pages 32-34 for a description of Desirability Sums.) Next, he interacts with a discussion of a decision-making strategy based on assessment of rewards and risks, after which he estimates the probabilities of his successfully completing all the requirements for entry into each of the occupations. Finally, he once again indicates which of the occupations he favors most in light of the information he has accumulated about rewards (Desirability Sums) and risks (probability of entry).

Table E22 shows, in the first two columns, the frequency with which occupations were designated first choice when the set of three occupations was selected, and, in the third and fourth columns, the frequency with which they were designated first choice after assessment of rewards and risks.

Insert Table E22 about here

We must be cautious in interpreting Table E22, since it shows frequencies of choice, not changes. We cannot infer, for instance, that no students changed their minds about an occupation that has the same "post" frequency as "pre" frequency. We may note, however, that the most popular occupations, in terms of post frequency, were Lawyer, Psychologist, School Counselor, and Rehabilitation Counselor. Also, if we list occupations with a difference of 3 or more (in either direction) between the pre and post frequencies, we see that Civil Engineer gained 4 and Dentist, Political Scientist, Personnel Interviewer, and Rehabilitation Counselor gained 3, whereas Psychologist (-10); Interior Decorator/Designer (-5); Advertising Copywriter, Elementary School Teacher (-4); and Photographer, Registered Nurse, Early Childhood Teacher (-3) had losses.

Choice in relation to desirability outcomes. What influences students' choice of occupation in this context? Table E23 provides some insights. Under the heading "Desirability Outcome" are the frequencies with which students, in their pre choice, selected the occupation that later turned out to have the highest Desirability Sum, to come within 10 points of the highest sum[1], or to fall more than 10 points below the highest. Apparently, almost two-fifths of the time (39%) students did not designate as their first choice the occupation that, as they soon learned, was the most likely to satisfy their values.

Insert Table E23 about here

The next set of figures, under the heading "Which Strategy," assesses the post choice of occupation with respect to the measures of reward and risk. The reader should understand that the options listed in the table do not all exist at the same time. For example, if the student had estimated that his chances were equal for successfully entering each of the three occupations, he would have only the last two options on the list: He could choose either the occupation with the greatest Desirability Sum or one with a smaller sum. If he had made differential estimates of success, some of the first four options would be present, but not the last two; moreover, it might be that none of the three occupations had the fortunate combination of greatest Desirability Sum and greatest chances, and therefore the student would not have the first option. The reader should also remember that Sum high means having the highest Desirability Sum or coming within 10 points of the highest.

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[1] Students are told to ignore differences of 10 points or less between Desirability Sums. For a discussion of how the 10-point "error" term was estimated, see Counselor's Handbook for SIGI (which is Appendix G of this report), pp. IX-12--IX-14.

Nevertheless, we can make some inferences. The first four categories under "Which Strategy" represent instances of differences in both sums and chances. If we make the reasonable assumption that students would nearly always choose "Sum high, chances high" when that option was present, we have left 175 instances (90 + 64 + 21) where students had to choose on the basis of highest sum, best chances, or some combination in which neither factor was best. In 90 instances (51% of the time), they selected the occupation with the highest sum; in 64 instances (37% of the time), they selected the occupation with the best chances; and in 21 instances (12% of the time), they selected an occupation that had neither the highest sum nor greatest chances. (This last is not necessarily an illogical choice, since it may be the best combination of reward and risk. See Counselor's Handbook for SIGI, which is Appendix G of this report, pages IX-25--IX-26.) There were 34 occasions when students estimated their chances as equal for all three occupations. In this situation, they made the apparently logical choice (occupation with the highest sum) 26 times and the apparently illogical one 8 times. We must be careful, however, not to infer that those 8 choices came from students who did not know what they were doing. We have learned from our interviews that behavior which appears inexplicable in printouts often has some logical explanation--even if it is only that the student was late for class and pushed the last few buttons at random to reach "sign off" as quickly as possible.

Table E1: Responses by Experimentals and Controls to Questions 1-41 of SIGI Evaluation Questionnaires

(Unless otherwise noted, all figures except n's are percent.)

PERSONAL INFORMATION

C		E		
	**1.		Age:	
68		45	(1) 15-22	n E = 64
20		25	(2) 23-30	n C = 127
12		30	(3) Over 30	
0		0	(4) Rather not say	
	2.		Sex:	
48		45	(1) Male	n E = 64
52		55	(2) Female	n C = 127
	**3.		Year in college:	
52		22	(1) 1st	n E = 59
31		49	(2) 2nd	n C = 127
13		15	(3) 3rd	
4		3	(4) 4th	
0		10	(5) Graduate student	

CAREER DECISION-MAKING

C		E		
	4.		How well do you know what rewards and satisfactions you want from an occupation?	
24		22	(1) I know exactly what I want from an occupation.	n E = 64
62		73	(2) I have a general idea of what I want from an occupation.	n C = 128
12		5	(3) I'm not sure what I want from an occupation.	
2		0	(4) I have no idea what I want from an occupation.	
	**5.		How many occupations have you explored as possibilities for yourself?	n E = 63
3		2	(1) None	n C = 127
51		27	(2) 1-2	
33		40	(3) 3-4	
13		32	(4) More than four	
	6.		How many of the occupations that you know about are likely to give you the satisfactions you want?	n E = 64
8		11	(1) None	n C = 128
71		69	(2) 1-2	
19		14	(3) 3-4	
2		6	(4) More than 4	
	7.		Which of the statements below best describes how definite your career plans are?	n E = 64
28		42	(1) I know exactly the occupation I want to enter.	n C = 126
38		20	(2) I am trying to decide between two different occupations.	
18		19	(3) I am considering three or more different occupations.	
16		19	(4) I do not have any specific occupation in mind at this time.	
	*8.		How well do you think you can predict your grades in various programs at your college?	n E = 63
41		59	(1) I think I could predict my grades accurately in any program of study I might take.	n C = 128
49		30	(2) I think I could predict my grades accurately in one or two programs, but not in all	
10		11	(3) I have only a general idea of my grades in one or two programs.	
0		0	(4) I can't predict my grades well in any program.	
	**9.		Which of the following best describes the present state of your plans?	n E = 62
30		53	(1) I know which program to enroll in, which courses to take, and most of the other steps necessary to reach my occupational goal.	n C = 128
48		31	(2) I have a general idea of which program would be best, but I am not sure what other steps are necessary to reach my occupational goal.	
22		16	(3) I don't know which program to take. I need help in planning my education.	

Table E1 (continued)

C	E	
		10. Overall, how confident do you feel about your career decision-making skills? $n_E = 62$ $n_C = 128$
38	42	(1) Very confident
53	48	(2) Somewhat confident
9	10	(3) Not confident

Items 11-18 are activities related to thinking about occupations. Put a check under the heading which shows how much time you have spent on each of the activities.

		Never	Rarely	Sometimes	Often
11.	Reading about occupations. $n_E = 63$ ($n_C = 128$)	6 (7)	24 (20)	52 (51)	17 (22)
12.	Talking with friends about the kinds of occupations they are considering. $n_E = 63$ ($n_C = 127$)	8 (2)	11 (7)	40 (37)	41 (54)
13.	Talking with people in the field about their occupations. $n_E = 63$ ($n_C = 128$)	13 (5)	24 (22)	35 (42)	29 (31)
* 14.	Using the college's career reference library. $n_E = 63$ ($n_C = 128$)	40 (56)	35 (33)	16 (9)	9 (2)
15.	Attending career planning workshops. $n_E = 63$ ($n_C = 126$)	71 (68)	13 (18)	16 (12)	0 (2)
16.	Talking to a guidance counselor about careers. $n_E = 63$ ($n_C = 128$)	21 (30)	36 (36)	33 (29)	10 (5)
17.	Using career-related audiovisual materials. $n_E = 63$ ($n_C = 128$)	70 (73)	16 (21)	11 (5)	3 (1)
** 18.	Using a computer-based guidance system. $n_E = 63$ ($n_C = 128$)	13 (83)	52 (15)	30 (2)	5 (0)

For statements 19-24, put a check under the heading that best describes how you feel.

		Strongly Disagree	Disagree	Agree	Strongly Agree
19.	I would follow the advice of a teacher, counselor, parent, or friend in planning my career. $n_E = 58$ ($n_C = 127$)	2 (7)	33 (25)	64 (62)	2 (6)
20.	Which occupation I enter will be mostly a matter of chance. $n_E = 63$ ($n_C = 128$)	51 (55)	38 (38)	8 (6)	3 (1)
21.	Everyone seems to tell me something different, so I don't know which career to choose. $n_E = 62$ ($n_C = 128$)	23 (31)	56 (46)	18 (18)	3 (5)
22.	I will decide for myself which occupation to choose. $n_E = 62$ ($n_C = 127$)	0 (2)	3 (1)	50 (39)	47 (58)
** 23.	In order to plan for a career, I would need to know how soon I would be getting married. $n_E = 59$ ($n_C = 126$)	63 (37)	27 (41)	7 (18)	3 (4)
24.	There is plenty of time before I have to start thinking about choosing an occupation. $n_E = 63$ ($n_C = 128$)	48 (44)	43 (46)	9 (10)	0 (0)

Table E1 (continued)

25. Rate yourself on how good a career decision-maker you think you are.

	$\overline{X}$	S.D.
$n_E = 60$	6.93	1.90
$n_C = 128$	7.16	1.83

Look at the scale below. Think of a friend your age who, in your opinion, makes good career decisions. Consider that person at the top of the scale (10).

Think of a friend your age who is not a good career decision-maker. Consider that person at the bottom of the scale (0).

Now think about yourself as a career decision-maker. Where do you fit on this scale? Circle the appropriate number on the scale from 0 to 10.

	0	1	2	3	4	5	6	7	8	9	10
E	0	2	0	3	5	13	13	17	27	15	5
C	0	0	0	2	6	13	15	21	20	9	14
	poor career decision-maker										good career decision-maker

For items 26- 29 mark an X on the part of the scale which best shows what is true of you.

26. How much do you know about occupations?

	$\overline{X}$	S.D.
$n_E = 63$	2.57	.92
$n_C = 127$	2.46	.87

	0		1		2		3		4
E	2	2	8	3	30	3	35	5	13
C	2	1	7	2	38	8	26	6	10
	very little								a great deal

27. How often do you plan ahead?

	$\overline{X}$	S.D.
$n_E = 63$	2.94	.93
$n_C = 127$	3.10	.87

	0		1		2		3		4
E	2	0	5	0	28	2	35	6	29
C	0	0	4	2	19	2	30	9	34
	rarely								often

28. How do you feel after making an important decision?

	$\overline{X}$	S.D.
$n_E = 63$	3.14	.57
$n_C = 127$	3.04	.71

	0		1		2		3		4
E	0	0	0	0	8	6	59	3	24
C	0	0	2	2	16	3	47	8	22
	I usually don't think I've done the right thing.								I am sure I did the right thing.

29. How clear is your knowledge of goals and values?

	$\overline{X}$	S.D.
$n_E = 63$	3.06	.83
$n_C = 127$	3.11	.84

	0		1		2		3		4
E	0	2	2	2	16	3	48	6	30
C	0	0	3	2	16	5	33	5	36
	not clear								very clear

OCCUPATIONAL INFORMATION

✱ 30. What occupation would you most like to prepare yourself for eventually? Even if you are undecided, pick an occupation that appeals to you.

Name of occupation: Items 31+32+33+34, Information Test

	$\overline{X}$	S.D.
$n_E = 48$	6.66	1.05
$n_C = 85$	6.26	1.12

Table E1 (continued)

% Right | % WR

Answer questions 31-34 in relation to the occupation named in Item 30.

E77 23 / C85 15

31. To enter this occupation, how much education beyond high school would you need?

___ (1) None.
___ (2) 2 years.
___ (3) 4 years (bachelor's degree).
___ (4) 5-6 years (master's degree).
___ (5) 7 or more (doctorate or law degree).
___ (6) Other (please explain: ________________________________)
___ (7) I don't know.

E65 35 / C58 42

32. Check the salary range that indicates the average amount of money per year earned by people in this occupation.

___ (1) $20,000 or more
___ (2) $15,000-$19,999
___ (3) $11,000-$14,999
___ (4) $8,000-$10,999
___ (5) $7,999 or less
___ (6) I don't know.

E46 54 / C39 61

33. Check the one statement which best describes the amount of supervision usually received by workers in this occupation.

___ (1) Work without supervision; plan own work; seldom evaluated by others.
___ (2) Supervised weekly; follow overall assignments.
___ (3) Supervised daily; work under supervisor who assigns and schedules work; free to decide details of work.
___ (4) Supervised hourly; activities are directly supervised with little opportunity to act on your own.
___ (5) I don't know.

E77 23 / C44 56

34. Check the one statement which best describes the future employment prospects for workers in this occupation.

___ (1) Excellent: Strong demand for workers; shortage of qualified people.
___ (2) Good: Steady demand for workers.
___ (3) Fair: Demand limited except in certain geographic areas OR demand is decreasing due to automation or economic conditions.
___ (4) Poor: Little demand, if any; the occupation is very overcrowded, and few jobs are available.
___ (5) I don't know.

35. What college program (major) are you presently enrolled in? ____________________

36. What occupation are you preparing for in this program or major? ____________________

CAREER GUIDANCE

37. Have you seen a counselor during the last two months? $n_E = 63$ 46 / $n_C = 128$ 42 (1) Yes 54 / 58 (2) No

38. If yes, what thing(s) did you discuss? $n_E = 95$ $n_C = 156$

C	E	
10	6	(1) Your values
15	17	(2) Occupational choice
17	13	(3) Occupational information
12	22	(4) Curriculum choice
21	18	(5) Course selection
7	6	(6) Chances for success
5	6	(7) Program approval
4	2	(8) Family pressures
6	5	(9) Financial aid
3	4	(10) Other (please explain: ________________________________)

Table E1 (continued)

39. Have you taken or are you presently enrolled in a career guidance course at your college?

$n_E = 63$ 24 (1) Yes 76 (2) No

$n_C = 128$ 22 78

C	E	
		40. If yes, how would you rate it? $n_E = 14$ $n_c = 25$
32	29	(1) Excellent
68	71	(2) Adequate
0	0	(3) Poor

		41. How do you feel about interacting with a computer for career guidance? $n_E = 62$ $n_c = 127$
41	52	(1) Favorable
54	40	(2) Neutral
5	8	(3) Unfavorable

* $p < .05$

** $p < .01$

Table E2

Occupations Named by Experimentals in Response to Question #30

In SIGI[a]	Not in SIGI	Too Vague to Classify
(48 occupations)	(4 occupations)	(11 responses)
Accountant	Park Ranger	Business
Actuary	Printer	Business Journalism
Computer Programmer	Ticket Agent (Airlines)	English teacher-counselor
Dental Hygienist	Writer	Library science catalogue
Diesel Mechanic (2)[b]		Mathematics [computer-programming]
Dietitian		Psychology-dentistry
Draftsman		Public speaking
Engineer (3)		Teacher-counseling
Geographer		Technical instructor
Home Economist		Television-film making
Hospital Administrator		(Blank)
Lawyer (3)		
Legal Assistant		
Manufacturer's Salesworker		
Medical Record Administrator		
Musician		
Occupational Therapist		
Oceanography		
Personnel Interviewer		
Photographer		
Physical Therapist (2)		
Physician (2)		
Pilot (3)		
Police Officer		
Rehabilitation Counselor		
School Counselor (3)		
Secretary		
Social Service Aide		
Speech Pathologist		
Teacher Aide		
Teacher, Elementary		
Teacher, P.E.		
Teacher, Special Education		
Teacher, Voc/Tech (2)		
Veterinarian		

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[a] If the occupational title used by the student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Social Worker Aide" is listed as "Social Service Aide," "Airline Pilot" as "Pilot," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table E3

Occupations Named by Controls in Response to Question #30

In SIGI[a]

(85 occupations)

Accountant (4)[b]
Architect (3)
Biologist
Clergy
Commercial Artist (2)
Correction Officer
Dentist (3)
Diesel Mechanic
Draftsman
Electrical Engineer
Farmer
Fine Artist
Interior Decorator (2)
Lawyer (4)
Librarian
Machinist
Musician
Nurse, Registered (8)
Nurseryman/Landscaper
Pharmacist
Physician
Physician's Assistant
Physicist
Psychologist (8)
Physical Therapist
Recreation Worker
Retail Store Manager (3)
School Counselor (2)
Secretary
Social Worker (2)
Speech Pathologist
Teacher, Art
Teacher, Elementary (10)
Teacher, English (2)
Teacher, History (2)
Teacher, Industrial Arts
Teacher, Physical Education (4)
Teacher, Special Education
Teacher, Voc/Tech
Veterinarian
Zoologist

Not in SIGI

(12 occupations)

Business Manager (2)
Electrician
Evangelist
Historian
Housewife
Horticulture
Judge
Personnel Director
Recreation Therapist
Retail Sales & Merch.
Travel Agent

Too Vague to Classify

(31 responses)

Accounting & education
Advertising & public relations
Agriculture/diesel mechanic
Biology/photography/nutrition
Business (2)
Business consultant/accountant/lawyer
Civil service worker
Counselor (3)
Criminal justice
Design modeling
Early childhood or social work
Guidance counselor/social worker
Journalism
Health related occupation
Law enforcement (2)
Marketing
Mechanic, bus driver, sports
Mechanical design
Midmanagement, business field, supervisor, buyer, seller
Rodeo
Technical electronics
Working with people (2)
Writer-reporting
(Blank) (3)

---

[a] If the occupational title used by student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Pianist" is listed as "Musician," "Minister" as "Clergy," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table E4

Responses to Questions 42-45 of SIGI Evaluation Questionnaire for Controls

(Unless otherwise noted, all figures except n's are percent.)

---

42. Are you aware that there is a computerized guidance system (SIGI) on campus? n = 128
66 (1) Yes 34 (2) No

43. If yes, what is your impression of SIGI? n = 88
49 (1) Favorable
42 (2) Neither favorable nor unfavorable
1 (3) Unfavorable
8 (4) No impression

44. How did you learn about SIGI? n = 103
14 (1) Friends
48 (2) Counselor
9 (3) Posters, Brochures
7 (4) Newspaper
22 (5) Other (please explain: ______________________________)

45. Do you want to use SIGI? n = 118 75 (1) Yes 25 (2) No

If yes, when? ______________________________

If no, why not? ______________________________

PLEASE RETURN THIS QUESTIONNAIRE TO ETS IN THE ENVELOPE PROVIDED.

THANK YOU FOR YOUR COOPERATION.

Table E4A

Control Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #38 (Other Reasons for Seeing a Counselor)

What jobs would help prior to this job?
Problems "day cares" face.
Psychology course.
Courses.
Aptitude testing.

Question #44 (Other Ways of Learning About SIGI)

TV news feature. (Mentioned by 2 students.)
Teachers. (Mentioned by 13 students.)
Husband.
Worked in office where located.
Orientation.
Psychology class.
My mother.
Started working with SIGI in testing center.
A counselor gave us a test related to this in class about 2 years ago.
This questionnaire. (Mentioned by 4 students.)
P. E. teacher passed out form.

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[a] Some of the responses have been slightly edited.

Table E5

Responses to Questions 42-88 of SIGI Evaluation Questionnaire for Experimentals

(Unless otherwise noted, all numbers except n's are percent.)

EVALUATION OF SIGI

Circle the grade that you would give SIGI on each of the following:

	A,	B,	C,	D,	or F
42. How interesting was SIGI to you? n = 63	52	27	16	5	0
43. How clear was SIGI in giving information? n = 63	56	27	13	5	0
44. Overall, how good is SIGI? n = 60	32	45	18	5	0

Circle the grade that shows how useful SIGI was in each of the following:

	A,	B,	C,	D,	or F
45. Helping you decide which occupation to prepare for. n = 63	16	43	21	10	11
46. Helping you become more aware of your values. n = 63	52	25	11	6	5
47. Showing you the relationship between values and career decisions. n = 63	51	27	16	6	0
48. Helping you find out which occupations might fit your values. n = 63	49	24	19	8	0
49. Helping you get information about occupations. n = 61	52	34	7	5	2
50. Helping you understand grade predictions expressed in probabilities. n = 59	29	29	32	7	3
51. Helping you estimate probabilities of success in one or more programs. n = 59	30	27	36	7	0
52. Giving information about programs of study at your school. n = 60	20	23	35	15	7
53. Helping you plan a program appropriate for an occupation you are considering. n = 61	21	31	25	13	10
54. Helping you learn how to make career decisions. n = 61	31	33	27	7	2

55. What role has SIGI played in your occupational choice? n = 68
7 (1) SIGI helped me to choose an occupation.
44 (2) SIGI helped confirm the choice I had already made.
31 (3) SIGI suggested other things which I am considering.
18 (4) SIGI provided little or no help.

Table E5 (continued)

To get help with occupational and educational decisions, you can go to SIGI and to a counselor. For each of the following, (56-63), put a check under the heading which, in your opinion, represents the best source of help.

		SIGI Alone	Counselor Alone	SIGI & Counselor
56.	Plan program of study n=62	6	35	58
57.	Get information about occupations n=62	26	11	63
58.	Confirm an occupational choice n = 57	28	14	58
59.	Find occupations that fit values n=61	57	0	43
60.	Find out about financial aid n=62	3	69	27
61.	Make values more clear n=60	50	2	48
62.	Resolve conflicts about occupational choice n=60	13	29	58
63.	Estimate chances of success in a program n=59	29	3	68

64. Have you scheduled or do you plan to schedule an appointment with a counselor as a result of using SIGI? n = 63 57 (1) Yes 43 (2) No

65. If yes, what was or will be the purpose of this visit? Check all the topics you discussed or plan to discuss. n = 147
9 (1) Your values
17 (2) Occupational choice
16 (3) Occupational information
14 (4) Curriculum choice
17 (5) Course selection
7 (6) Chances for success
7 (7) Program approval
1 (8) Family pressures
2 (9) Financial aid
8 (10) SIGI print-outs
2 (11) Other (please explain: ____________________)

66. In using SIGI, did the occupations of interest to you show up on the list determined by your values? n = 63 67 (1) Yes 33 (2) No

67. Were there any occupations missing from SIGI that you were interested in? ____(1) Yes ____(2) No

If yes, name them: ____________________

____

68. Compared to other kinds of occupational information, how would you rate the occupational information presented in SIGI? n = 62
63 (1) Better
32 (2) About the same
5 (3) Worse

69. SIGI has 28 questions you can ask about occupations. Are there other questions about occupations that you wish had been in SIGI? n = 61 16 (1) Yes 84 (2) No

If yes, what question(s) would you add to the SIGI list?

____

____

____

Table E5 (continued)

70. How would you rate SIGI's writing style and vocabulary? $\underline{n} = 63$
3 (1) Too difficult
90 (2) Just right
6 (3) Too simple

71. Did you find sexual, racial, or other bias in SIGI? $\underline{n} = 63$ 2 (1) Yes 98 (2) No

If yes, give examples:

72. Below is a list of problems that may have occurred in using SIGI. Check any $\underline{n} = 106$ that you experienced:
10 (1) I did not understand some of the directions.
8 (2) The writing on the screen strained my eyes.
20 (3) I had to wait too long for an appointment to use SIGI.
9 (4) There was too much reading.
19 (5) I felt rushed while using SIGI.
8 (6) The computer broke down while I was using SIGI.
2 (7) The writing on the screen was jumbled.
8 (8) I wanted to sign off SIGI, but couldn't.
14 (9) Other (please explain: ______________________________)

73. How often did you request a print-out on SIGI? $\underline{n} = 64$
72 (1) Frequently
17 (2) Sometimes
8 (3) Once or twice
3 (4) Never

74. After using the computer, did you do anything to get more information on your own? $\underline{n} = 63$
68 (1) Yes 32 (2) No

75. If yes, what did you do? $\underline{n} = 57$
40 (1) Read
39 (2) Spoke to people in the occupation
3 (3) Used audiovisual material
18 (4) Other (please explain: ______________________________)

76. How much time did you spend on SIGI? $\underline{n} = 64$
20 (1) 1-2 hours
63 (2) 2-4 hours
17 (3) 4-6 hours or more

77. Did you go all the way through SIGI (including the Strategy section)? $\underline{n} = 63$
84 (1) Yes 16 (2) No

78. Over how many sessions did you use SIGI? $\underline{n} = 64$
47 (1) One
39 (2) Two
14 (3) Three or more

79. Do you think you would profit from further use of SIGI? 52 (1) Yes 48 (2) No $\underline{n} = 62$

80. If yes, how many additional sessions would you like? $\underline{n} = 32$
44 (1) One
50 (2) Two
6 (3) Three or more

Table E5 (continued)

81. Which sections would you use most? n =123
- 16 (1) Values
- 12 (2) Locate
- 20 (3) Compare
- 14 (4) Prediction
- 24 (5) Planning
- 14 (6) Strategy

82. Is there anything SIGI didn't cover that you would like it to cover? n =59
20 (1) Yes 80 (2) No

If yes, please explain:

83. Is there any area you wish SIGI had covered more fully? n =59 27 (1) Yes 73 (2) No

If yes, please explain:

84. What did you like **best** about SIGI? (check **one** only) n =77
- 26 (1) Learning about my values
- 22 (2) Finding occupations that fit my values
- 31 (3) Getting occupational information
- 0 (4) Getting grade predictions
- 4 (5) Learning what courses to take to prepare for an occupation
- 5 (6) Learning a strategy for making decisions
- 10 (7) Learning how values affect decisions
- 1 (8) Other (please explain: ______)

85. What you did on SIGI was completely private. How important is this fact to you? n =64

0		1		2		3		4
36	0	11	2	16	2	8	3	23
privacy made no difference								very important

86. Have you advised friends at your college to use SIGI? 71 (1) Yes 29 (2) No
n =63

87. If yes, how many? n =45
- 38 (1) 1-2
- 44 (2) 3-5
- 18 (3) 6 or more

88. Is there anything else you would like to tell us that would help us improve SIGI?

PLEASE RETURN THIS QUESTIONNAIRE TO ETS IN THE ENVELOPE PROVIDED.
THANK YOU FOR YOUR COOPERATION.

Table E6

Experimental Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #65 (Purpose of Appointment with Counselor)

Where to go to fulfill choices.
Which school.
Job prospects that might interest me.

Question #67 (Occupations of Interest Missing from SIGI)[b]

Parks and recreation, specifically.
Writing (fiction and nonfiction).
Airline reservation and ticket agent.
I don't remember which ones were listed--but at the time there were many that were not listed.
T.V. Director--film writer.
Occupations dealing with speech activities.
Dental ceramist, doctor's assistant, but not nurse.
Librarian aide.
Agricultural education.
I'm sure SIGI can't list every job available; therefore the need for the counselor.
Engineer instructor.
More agricultural courses [animal science, ag. economics, etc.].
Bilingual teacher.
Not certain what type of job would interest me. I have had very few jobs.
Occupational therapy.
Marriage counseling, legal assistant, college teacher.
More areas in social science and urban studies.
Mechanical engineering, pilot.
Athletic coach, two others that can't come to mind at the moment.
Docent [teacher or lecturer], or tour guide or working in tour agency.
Adv. account executive; adv. professor. There were others, but since I used SIGI almost 7 months ago, it is hard to remember.

Question #69 (Additional Questions Students Would Like to Ask)

What is the best way I, in my high school classes, prepare for my future career?
Information concerning middle-aged and older persons who have already or will soon start on different educational or occupational pursuits.
There were specific questions at the time I used SIGI, but that was so long ago I've forgotten.
How does a felony conviction apply?
Actually an expansion of the present answers given to the questions is needed.
I believe someone should counsel and explain SIGI before putting you on it.

Table E6 (continued)

Question #69 (continued)

(a) Region of best chances for employment in field; (b) Possible list of best to moderate schools to attend for the chosen field or occupation.
Quality of personnel employed in field, 10-year projection of income, employment, standards.
SIGI was very detailed in this respect and I can't think of any question I would have wanted to ask that wasn't in SIGI.
What area of the country do you plan to work in? Does your husband or wife plan on working? If so, how much money will they make? I would regionalize information for more accurate averages. I would help balance careers with expected income.

Question #71 (Examples of Bias in SIGI)

How can a machine reflect sexual, racial or any other bias?
There is a definite undergraduate bias.

Question #72 (Other Problems in Using SIGI)

So much repetition I became bored. (Mentioned by 2 students.)
Sometimes would like to return to a section but didn't know how.
Had to use a new number [to sign on SIGI]. It would not respond to the old one.
Had to do it several times to be sure.
I punched the wrong key once and did not have an opportunity to correct the error.
I sometimes misunderstood because the directions were not clear.
I was not sure I wouldn't miss something if I signed off at the wrong time. Also, I punched the wrong button once and had to go all the way through the program before I could go back to where I made the mistake.
Wanting to back up--usually covered later, but not always.
The printer should print faster.
Sometimes I was confused as to what I was supposed to do next.
I was too impatient to ask about a lot of occupations.
After a period of time it became boring to me.
Information was out of date.

Question #75 (Other Steps Taken to Get More Information After Using SIGI)

Sent for career information.
Talked to teachers who have had practical experience.
Read catalogue. (Mentioned by 2 students.)
I saw a counselor. (Mentioned by 6 students.)
Wrote for information.
I re-checked my earlier choice which was diesel mechanic.

Table E6 (continued)

Question #82 (Additional Topics SIGI Could Have Covered)

More specific ways to prepare for a career through education and experience.
Would like to see an even more extensive list of occupations than was given by the computer.
Options available to the homemaker returning to the work force. It was too keyed to the younger person.
More information for those persons who are changing directions in middle age or beyond.
SIGI appeared to relate to jobs on a national level. I feel a local or regional approach would be more beneficial.
Lists of personal data that should discourage an individual from attempting to succeed in a particular field.
Schools in the metroplex where credits will transfer.
I think the one I used did not have the prediction section.
Under qualifications for pilot you need to include hours of flight time already logged, and delete the part about eye glasses which I do not believe is correct.
An evaluation using one's experience already attained and how that experience could effect your future plans.
The SIGI I used did not have the prediction or planning portions. Now it has been added and I am going back again.
Current data and market trends.

Question #83 (Areas That Should Have Been Covered More Fully)

Additional options for those already experienced in the work force, but who wish to change direction.
College courses offered for a particular field of study.
The compare section. I felt there was more I could find out but didn't really know how to.
Diesel.
Comparing.
All of them.
Could have covered occupational information more fully.
A little more detailed information about the salary, time spent in school, and a little more specific in financial aides.
Strategy and possibly more on the values system.
Help to those who don't have definite idea of future plans but do want to improve themselves.
Prediction and planning were not included. Now they have been added and I am going back again.
More occupations, regional salaries.
I would have liked a "predict" section and more information on what courses were needed for an occupation.

Table E6 (continued)

Question #84 (Other Things Liked Best About SIGI)

It was an interesting experience with a computer memory system.

Learned some [values] I thought were very important to me did not really mean as much as others.

---

[a] Some of the responses have been edited slightly.

[b] In some cases students suggested occupations or innovations already in SIGI.

Table E7

Suggestions for Improvements in SIGI Given by Experimentals in Response to Question #88[a]

Have more than one CRT working at a time. Revise data semi-annually or more. You have made a good start--but do not stop now.

No. The program was very useful to me and has helped me decide what I need.

SIGI is just all right.

The values and compare sections were most useful. Prediction section was of little value.

Advise freshmen and juniors use strongly.

The SIGI I used did not have some items but since have been added. Thank you.

The people I talked to did nothing to prepare me for the use of SIGI. I merely wanted to know what my best qualifications were so that I might best apply them for a better job and know what and how much education that would take.

Really enjoyed the chance to use SIGI.

I feel that SIGI should be made more public to the students, because it would definitely benefit them.

They advised specific courses to take for pre-med, then the school I went to wouldn't accept 5 courses I had taken in an earlier school.

SIGI re-enforced my choice of occupations and I only wished such testing had been available in 1944. SIGI confirmed my values in selecting an occupation plus my choice of nursing or counseling. I'm attempting to build on the latter now.

Thank you.

It was great! I thought it a little tiring. I used it about 3 1/2 hours straight, would have liked to use it twice and split the time.

SIGI said I would have chances to go to prediction which I never did, it also said in 2 or 3 places "we will explain this further in a few minutes", but it never did.

I just wish I hadn't pressed the wrong key that one time, because it gave me an incorrect response. The key I intended to push was the correct answer. I wanted to explain that. It only happened once, but it gave me a "bad" feeling.

Table E7 (continued)

It is difficult to understand and SIGI seems not to work out for me because too complex for me.

This survey would have been a lot more helpful to you if I had received it about 6 or 7 months ago. As of now, I've forgotten most of what happened.

It repeated too many questions.

Less reading.

It should be moved to a quieter location. While working, the distractions kept me from completely benefiting from the program. I did not feel free to take my time. Because I hurried, I lost some of the thought.

I conferred with SIGI during the summer when I had no trouble getting an appointment, or in spending as much time as I liked with it. I understand that is not true during other times of the year. Maybe we could use another SIGI.

For me the use of SIGI was an interesting but not very useful experience. I am a former teacher, currently a homemaker, who is interested in resuming a career outside the home. I found about 2/3 of the SIGI material inapplicable to me.

The one occupation SIGI kept flashing was one in which I have no desire to do (political scientist). I found myself trying to figure what values I would need to satisfy SIGI's demands. SIGI is too rigid for me. I did receive some valuable information though.

Replace some of the outdated occupations and continually change the occupations to fit today's trends.

Would like to see more SIGI programs offered to the general public than just at the one junior college (Eastfield) in Dallas. Think the SIGI program needs greater publicity also.

I went through the SIGI program last spring and it took me until the month of September to get an audience with a counselor. The people with whom I dealt this past spring who were responsible for implementing and explaining SIGI seemed totally disinterested with me and my participation in the program. I suppose it takes 2 or 3 tries to get it right, but I don't intend to take it again.

Make it easier to get an appointment. I feel you need to spend at least an hour per sitting--this limits number of appointments--we need 2 or more machines.

Make career planning information more precise if possible.

Learning my values was of great importance to me and helped me a lot. But the occupations that fit values or locating section was also of great help. The major problem I had was that three occupations did not fit my values but SIGI did not tell me why they did not fit.

Table E7 (continued)

On question #44 I gave SIGI a B because I feel I was rushed in using it and because I wanted to sign off and then pick up exactly where I left off, but couldn't do it. Also I feel everyone who uses SIGI would need to visit a counselor and/or read up on requirements of other colleges to get a complete view of occupational choices.

It was my fault I didn't get more out of it. I used it thinking I knew the occupation I wanted, so I didn't get information on enough careers. I have now changed my major, so SIGI didn't do much good. I am so mixed up right now I would love to do SIGI again and get information on many majors that I've been thinking about. SIGI is definitely better than counselors or any occupational test I've taken.

---

[a] Some of the responses have been edited slightly.

Table E8: SIGI EVALUATION QUESTIONNAIRE FOR COUNSELORS

BACKGROUND INFORMATION

1. What percent of your time do you spend in career counseling (as opposed to personal counseling, academic advisement, etc.)?
   - 0 (1) None
   - 2 (2) 25% or less
   - 3 (3) 25-50%
   - 0 (4) 50-75%
   - 0 (5) 75-100%

2. On the average, how many students do you see each week for career counseling?
   - 0 (1) None
   - 1 (2) 1-5
   - 4 (3) 5-10
   - 0 (4) 10-20
   - 0 (5) 20 or more

3. How long are most sessions for career counseling?
   - 0 (1) less that 30 minutes
   - 4 (2) 30 minutes to an hour
   - 1 (3) one to two hours

Please indicate whether you agree or disagree with each of the following statements about computer-based guidance systems.

	Agree	Disagree	Not sure
4. Computer-based guidance systems are a passing fad.	1	5	0
5. Computer-based guidance systems can relieve counselors of many routine duties, leaving more time for professional counseling activities.	4	1	1
6. Computer-based guidance systems are a potential threat to the jobs of counselors.	0	6	0
7. I will probably never make much use of computer-based guidance systems in my work with students.	0	4	2
8. Computer-based guidance systems are capable of helping students make rational career decisions.	3	0	3

EXPERIENCE WITH SIGI

9. Have you attended a SIGI Counselors' Workshop? 5 (1) Yes 1 (2) No

10. Have you had a chance to use SIGI yourself? 6 (1) Yes 0 (2) No

11. If so, which of the SIGI subsystems have you been through?

	Once	More than once
(1) VALUES	3	3
(2) LOCATE	3	3
(3) COMPARE	3	3
(4) PREDICTION	4	2
(5) PLANNING	2	2
(6) STRATEGY	2	2

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Table E8 (continued)

12. Have you referred students to SIGI? 6 (1) Yes 0 (2) No

If so, how many? ________

For what reasons? ________

13. How have most students at your college reacted to SIGI?

5 (1) Favorably
0 (2) Unfavorably
0 (3) No opportunity to observe
1 (4) Indifferent

14. Have students come to you with their SIGI printouts? 4 (1) Yes 1 (2) No

What problems, if any, have you had in helping students interpret their printouts?

15. Have students come to you with problems related to use of the SIGI terminals?

3 (1) Yes 3 (2) No

If so, what kinds of problems have they encountered? ________

Prior to having SIGI at your college, to what degree was each of the following (Items 16-22) a problem to you in your role as a counselor?

	Major problem	Minor problem	No problem	Not relevant to me
16. Getting students to read occupational information.	1	4	0	1
17. Keeping up-to-date on occupational information.	5	0	0	1
18. Identifying sources of occupational information.	1	3	1	1
19. Finding time to see all the students who want the help of a counselor.	0	1	3	2
20. Identifying students who need help with their educational and occupational plans.	2	2	1	1
21. Selecting appropriate programs of study for students' career goals.	0	3	2	1
22. Other:				

23. Has SIGI had an impact on any of the above problems? 4 (1) Yes 1 (2) No

If so, which ones? (Circle responses.)

(16)	(17)	(18)	(19)	(20)	(21)	(22)
4	3	1	1	1	1	0

Please explain: ________

Table E8 (continued)

Have you noticed a change in any of the following (Items 24-27) now that SIGI is available to students at your college?

		Increase	Decrease	No change	No opportunity to observe
24.	**Number of students you are able to see.**	0	0	4	1
25.	**Amount of time you spend doing career counseling.**	4	0	0	1
26.	**Length of career counseling sessions.**	0	0	4	1
27.	**Quality of group discussions about values and career decisions.**	2	0	2	1

28. **Do you know which of your students have used SIGI and which have not?**
5 (1) Yes **0 (2) No**

If so, in your opinion do students who have used SIGI rate higher than students who have not used it in their ability to:

	Yes	No	No opportunity to observe
(1) express clearly the satisfactions they want from an occupation?	3	2	0
(2) state their primary occupational choice?	3	2	0
(3) mention alternative possibilities?	4	1	0
(4) indicate sound reasons for their preference?	4	1	0
(5) show they are well-informed about their first-choice occupation?	3	1	0
(6) decide what programs of study are suitable for each occupation being considered?	4	1	0
(7) evaluate their chances of success in programs being considered?	3	1	1

29. **How do you think students should gain access to SIGI? (Check one or more.)**

3 **(1) Terminals should be available to students on a first-come, first-served basis, and follow-up sessions with counselors should be optional.**

1 **(2) Students should be required during their first year of college to use SIGI and schedule a follow-up session with a counselor.**

5 **(3) Counselors should refer students to SIGI and require a follow-up session afterward.**

4 **(4) SIGI should be used as part of a career guidance unit in a classroom course.**

0 **(5) Other:** ____________________

SUGGESTIONS FOR IMPROVEMENT

30. **What occupations do students frequently ask about that are missing from SIGI?**

31. **Are there other additional occupations that you would like to see included in SIGI?**
1 (1) Yes **0 (2) No**

If so, please list them: ____________________

32. **Are SIGI's writing style and vocabulary appropriate for your students?**
3 (1) Yes **1 (2) No**

If not, what changes would you suggest? ____________________

Table E8 (continued)

33. How does the occupational information in SIGI compare to other sources available to students at your college?
3 (1) Better
3 (2) About the same
0 (3) Worse

34. Did you find any sexual, racial, or other bias in SIGI? 0 (1) Yes 6 (2) No
If so, give examples:

35. What suggestions do you have for improving SIGI, the Handbook for Counselors, or the Counselors' Workshops?

OPTIONAL INFORMATION

Members of the SIGI research staff are especially interested in hearing about any personal experiences which you or your colleagues may have had in working with SIGI. Please use the space below to record any observations, amusing anecdotes, students' comments, etc., which you would like to share with us.

Name: College:

PLEASE RETURN YOUR QUESTIONNAIRE IN THE ENVELOPE PROVIDED

THANK YOU FOR YOUR COOPERATION

Table E9

Counselors' Responses to Open-Ended Items[a] on the Counselors' Questionnaire

---

Question 12 (Reasons for Referring Students to SIGI)

To train student assistants who will help other students with SIGI.

Decision-making process--a place to begin. Self-assessment and career information.

For reinforcement of personal values.

Career information, organizational skills, career process model.

Explore values--begin search comparing careers and interest, etc. Usually for students who don't have ideas about careers.

Value clarification in occupational decision-making.

Question 14 (Problems Associated with Printouts)

None (2 responses).

Letting student know he can do SIGI more than once; time length to do SIGI.

I am structuring my counseling sessions and follow-up so that the SIGI printouts can be an integral part of the show.

Question 15 (Problems Associated with the Terminals)

Too many responses are required to select occupations for Compare. Why not just select occupations directly?

Hardware problems.

Wouldn't advance.

Question 22 (Other Problems Associated with Career Counseling)

Career counseling is a slow, time-consuming process.

Question 23 (Impact of SIGI on Counseling Problems)

[Reference to #20]--The process of selecting students to use SIGI is not clear to me, but SIGI is booked up solid for at least six weeks in advance.

Question 29, Item 5 (Other Ways of Making SIGI Available to Students)

No responses.

Question 30 (Occupations Suggested by Students for Addition to SIGI)[b]

Medical technology and other related medical careers. Also, creative arts and business opportunities within arts marketing.

Table E9 (continued)

Question 31 (Occupations Suggested by Counselors for Addition to SIGI)

Don't know yet.

Question 32 (Suggested Changes in Writing Style)

We've had some problems with handicapped (deaf) students.

Review of reading levels should be made--this is a critical area. The small print and technical nature of the material make it unusable for some students.

Question 34 (Examples of Bias in SIGI)

No responses.

Question 35 (Suggestions for Improvement)

Have the representative who conducts the counselor's workshops actually be counselors from sites who have SIGI rather than ETS personnel.

More "counseling" approaches and techniques. ETS approach is more P.R., academic, and defensive than one of sharing.

Review of uses for counselors; more terminals for better access; session for counselors on the total SIGI experiment (i.e., other uses and their results); strategies for counseling with SIGI on an individual and group basis.

More specific guidelines for integrating SIGI into counseling and career guidance programs. At Eastfield, SIGI is too much stand-alone.

Optional Information

Aside from most people calling "SIGI" "HIGI," not much to report. The noise of the hardware becomes an almost subliminal drone that makes many notice the beast only when it is down.

Some lack of reinforcement for creativity?

In some instances the value system appears to be unrealistic. Students are forced to lower their value point system in order for the computer to produce a career--which is in essence inappropriate to their needs since they have been forced to reduce their values below what is realistic to them and what they know is realistic. Your representative appeared to be most biased in her questioning of students and counselors on their utilization and impressions of SIGI. She showed much reluctance to accept negative criticism. SIGI does have a place at Eastfield.

Time was used in questioning counselors at Eastfield--part of that time should have been used to go over actual counseling techniques that could be implemented in the SIGI program. ETS staff seems to be more concerned with supporting the present system than in implementing improvements. Many of our suggestions were put down by the statement, "But we at ETS don't agree." SIGI is a great system and should be supported.

---

[a] Some of the responses have been edited slightly.

[b] Some occupations in these fields are already in SIGI.

Table E10

Breakdown of Sample by Age, Sex, and Enrollment Status

Factor	%
Age	
18 or under	41.3
19-21	26.6
22-24	21.4
25 and over	10.7
Sex	
Male	49.7
Female	50.3
Enrollment status	
About to enter	10.9
1st semester or quarter	24.5
Completed 1 or more semesters	46.9
Other	17.7

Table E11

Initial Status with Respect to Career Decisions

VALUE STATUS (N= 523)	FREQ	%
I KNOW WHAT I WANT.	128	24.47
GENERAL IDEA OF WHAT I WANT.	273	52.20
WOULD KNOW IF I SAW IT.	38	7.27
I'M IN THE DARK.	84	16.06

OCCUPATION STATUS (N= 523)	FREQ	%
I CAN LIST 3 OCCUPATIONS.	57	10.90
1 OR 2 OCCUPATIONS THAT FIT.	83	15.87
NOT SURE THEY FIT MY VALUES.	102	19.50
I NEED LOTS OF INFORMATION.	281	53.73

PREDICTION STATUS (N= 523)	FREQ	%
PREDICT GRADES IN ANY PROGRAM.	196	37.48
PREDICT GRADES IN SOME PROGRAMS.	200	38.24
GENERAL IDEA OF MY GRADES.	86	16.44
I CAN'T PREDICT MY GRADES.	41	7.84

PLANNING STATUS (N= 523)	FREQ	%
KNOW WHICH PROGRAM TO ENROLL IN.	91	17.40
GENERAL IDEA WHICH IS BEST.	193	36.90
DON'T KNOW WHICH PROG. TO TAKE.	239	45.70

Table E12

Means and Standard Deviations for the 10 SIGI Values

	Unrestricted[a]		Restricted[b]	
Value	$\overline{X}$	S.D.	$\overline{X}$	S.D.
Income	5.44	1.68	4.89	1.67
Prestige	4.52	1.99	3.14	1.50
Independence	5.35	1.75	4.53	1.63
Helping Others	5.22	2.25	4.29	2.30
Security	5.62	1.92	4.59	1.85
Variety	5.30	1.97	4.16	1.71
Leadership	4.63	2.03	3.54	1.72
Interest Field	5.87	1.80	5.42	1.70
Leisure	4.01	1.85	3.25	1.67
Early Entry	3.27	2.38	2.19	1.95

[a] Students weighted each value on a scale ranging from 0 (no importance) to 8 (maximum importance), with no restriction on the magnitude of the sum of the weights.

[b] Students were forced to adjust their value weights to sum to exactly 40 points.

Table E13

Frequency with Which Each of the Six Interest Fields Was Selected

Interest Field (N = 851[a])	Freq[a]	%
Scientific	117	13.75
Technological	56	6.58
Administrative	112	13.16
Personal Contact	291	34.20
Verbal	177	20.80
Aesthetic	98	11.52

[a] The n and frequency represent the number of times fields were selected. Students may choose more than once.

Table E14

Frequency with Which Values Were Used for Retrieval in Locate

VALUES IN LOCATE (N= 10370[a])	FREQ	%
INCOME.	1573	15.17
PRESTIGE.	579	5.58
INDEPENDENCE.	1329	12.82
HELPING OTHERS.	1022	9.86
SECURITY.	1159	11.18
VARIETY.	1135	10.95
LEADERSHIP.	787	7.59
INTEREST FIELD.	1568	15.12
LEISURE.	717	6.91
EARLY ENTRY.	501	4.83

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[a] The *n* represents the total number of selections, not the number of students using the Locate system.

Table E15

Level or Category of Specification Used in Locate

INCOME LEVEL SPECS (N= 1701)	FREQ	%
LESS THAN $8,000 IS OK.	62	3.64
MORE THAN $8,000.	254	14.93
MORE THAN $11,000.	601	35.33
MORE THAN $15,000.	532	31.28
MORE THAN $20,000.	252	14.81

PRESTIGE LEVEL SPECS (N= 618)	FREQ	%
BELOW AVERAGE IS OK.	47	7.61
AVERAGE AMOUNT.	234	37.85
MORE THAN AVERAGE AMOUNT.	269	43.53
GREAT AMOUNT	68	11.00

INDEPENDENCE LEVEL SPECS (N= 1429)	FREQ	%
BELOW AVERAGE IS OK.	83	5.81
AVERAGE AMOUNT.	539	37.72
MORE THAN AVERAGE AMOUNT.	637	44.58
GREAT AMOUNT	170	11.90

HELP OTHERS LEVEL SPECS (N= 1114)	FREQ	%
BELOW AVERAGE IS OK.	59	5.30
AVERAGE AMOUNT.	210	18.85
MORE THAN AVERAGE AMOUNT.	402	36.09
GREAT AMOUNT	443	39.77

SECURITY LEVEL SPECS (N= 1287)	FREQ	%
BELOW AVERAGE IS OK.	58	4.51
AVERAGE AMOUNT.	489	38.00
MORE THAN AVERAGE AMOUNT.	522	40.56
GREAT AMOUNT	218	16.94

VARIETY LEVEL SPECS (N= 1268)	FREQ	%
BELOW AVERAGE IS OK.	63	4.97
AVERAGE AMOUNT.	395	31.15
MORE THAN AVERAGE AMOUNT.	570	44.95
GREAT AMOUNT	240	18.93

LEADERSHIP LEVEL SPECS (N= 874)	FREQ	%
BELOW AVERAGE IS OK.	84	9.61
AVERAGE AMOUNT.	299	34.21
MORE THAN AVERAGE AMOUNT.	327	37.41
GREAT AMOUNT	164	18.76

Table E15 (continued)

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INTEREST FIELD SPECS (N= 1691 )                        FREQ                %
                                                       ----                -
   SCIENTIFIC.                                          240            14.19
   TECHNOLOGICAL.                                        99             5.85
   ADMINISTRATIVE.                                      196            11.59
   PERSONAL CONTACT.                                    786            46.48
   VERBAL.                                              196            11.59
   AESTHETIC.                                           174            10.29

LEISURE LEVEL SPECS (N= 786 )                          FREQ                %
                                                       ----                -
   SMALL AMOUNT IS OK.                                   51             6.49
   LESS THAN AVERAGE AMOUNT.                             72             9.16
   AVERAGE AMOUNT                                       454            57.76
   MORE THAN AVERAGE AMOUNT.                            209            26.59

EARLY ENTRY LEVEL SPECS (N= 522 )                      FREQ                %
                                                       ----                -
   5 OR MORE YEARS.                                     168            32.18
   4 YEARS.                                             184            35.25
   2 OR 3 YEARS.                                        119            22.80
   1 YEAR OR LESS.                                       51             9.77
```

Table E16

OCCUPATIONS IN LOCATE(NOVICE & INITIATE) (N= 8669[a] & 1054[b])

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	3	0.03	1	0.09
ADVERTISING COPYWRITER.	9	0.10	1	0.09
AIR COND, REFRIG, & HEAT MECH.	4	0.05	0	0.00
ACCOUNTANT.	10	0.12	2	0.19
AIRCRAFT MECHANIC.	2	0.02	0	0.00
APPLIANCE REPAIR TECHNICIAN.	0	0.00	0	0.00
ARCHITECT.	69	0.80	11	1.04
AUTOMOBILE SALESWORKER.	1	0.01	0	0.00
ARCH. TECH. AND DRAFTSMAN.	6	0.07	0	0.00
AVIONICS TECHNICIAN.	0	0.00	0	0.00
AUTOMOBILE MECHANIC.	1	0.01	0	0.00
ACTUARY.	41	0.47	20	1.90
BROADCAST TECHNICIAN.	9	0.10	0	0.00
BEAUTICIAN.	10	0.12	0	0.00
BOTANIST.	52	0.60	6	0.57
BOOKKEEPER.	1	0.01	0	0.00
BUSINESS MACHINE REPAIR TECH.	9	0.10	1	0.09
BANK OFFICER.	91	1.05	9	0.85
BANK TELLER.	3	0.03	0	0.00
COMMERCIAL ARTIST.	1	0.01	0	0.00
CLOTHING DESIGNER.	21	0.24	7	0.66
CHEMICAL ENGINEER.	91	1.05	13	1.23
CHEMIST.	17	0.20	4	0.38
CLERGY.	126	1.45	11	1.04
COMPUTER OPERATOR.	4	0.05	0	0.00
COMPUTER PROGRAMMER.	8	0.09	1	0.09
CIVIL ENGINEER.	218	2.51	37	3.51
DENTAL ASSISTANT	2	0.02	0	0.00
DENTIST	263	3.03	36	3.42
DENTAL HYGIENIST	6	0.07	0	0.00
DRAFTERSMAN	13	0.15	1	0.09
DIETITIAN	72	0.83	8	0.76
DIESEL MECHANIC	8	0.09	0	0.00
DANCER AND DANCING TEACHER	1	0.01	0	0.00
ECONOMIST	28	0.32	19	1.80
ELECTRICAL ENGINEER	41	0.47	7	0.66
ENGINEERING TECHNICIAN	10	0.12	0	0.00
ELECTRONICS TECHNICIAN	26	0.30	1	0.09
FINE ARTIST/PRIVATE ART TEACHER	19	0.22	7	0.66
FUNERAL DIRECTOR	76	0.88	12	1.14
FLIGHT ENGINEER	37	0.43	1	0.09
FLIGHT ATTENDANT	2	0.02	1	0.09
FORESTER	109	1.26	24	2.28
GEOGRAPHER	15	0.17	2	0.19
HOME ECONOMIST	163	1.88	17	1.61
HOTEL/MOTEL MANAGER	51	0.59	15	1.42
INSURANCE AGENT	8	0.09	2	0.19
INTERIOR DESIGNER/DECORATOR	27	0.31	7	0.66
INDUSTRIAL ENGINEER	198	2.28	32	3.04
INDUSTRIAL TRAFFIC MANAGER	13	0.15	4	0.38
INDUSTRIAL DESIGNER	97	1.12	12	1.14
INSTRUMENT REPAIR TECHNICIAN	0	0.00	0	0.00
SCIENCE LAB TECHNICIAN	0	0.00	0	0.00
LIBRARIAN	89	1.03	7	0.66
LABOR RELATIONS SPECIALIST	130	1.50	22	2.09

Table E16 (continued)

LIBRARY TECHNICIAN	2	0.02	0	0.00
LAWYER	385	4.44	42	3.98
MATHEMATICIAN	58	0.67	11	1.04
PHYSICIAN	337	3.89	42	3.98
MECHANICAL ENGINEER	73	0.84	12	1.14
METEOROLOGIST	37	0.43	11	1.04
MEDICAL RECORD ADMINISTRATOR	23	0.27	0	0.00
MEDICAL LAB TECHNICIAN	0	0.00	0	0.00
MODEL	1	0.01	0	0.00
MARKET RESEARCHER	12	0.14	5	0.47
MANUFACTURER'S SALESWORKER.	7	0.08	0	0.00
MEDICAL TECHNOLOGIST.	17	0.20	0	0.00
MUSICIAN/MUSIC TEACHER.	26	0.30	8	0.76
MACHINIST.	14	0.16	2	0.19
NURSERYMAN/LANDSCAPER.	30	0.35	6	0.57
NEWSPAPER REPORTER.	10	0.12	1	0.09
OCEANOGRAPHER.	67	0.77	12	1.14
OPTICIAN.	2	0.02	0	0.00
OCCUPATIONAL THERAPIST.	149	1.72	17	1.61
PURCHASING AGENT.	1	0.01	1	0.09
POLICE OFFICER.	10	0.12	1	0.09
PUBLIC HEALTH SPECIALITST.	102	1.18	11	1.04
PILOT.	41	0.47	5	0.47
POLITICAL SCIENTIST.	159	1.83	25	2.37
PHARMACIST.	15	0.17	0	0.00
NURSE, PRACTICAL.	2	0.02	0	0.00
PHOTOGRAPHER.	32	0.37	5	0.47
PUBLIC RELATIONS WORKER.	7	0.08	1	0.09
PHYSICIST.	13	0.15	0	0.00
PHYSICAL THERAPIST.	45	0.52	1	0.09
PERSONNEL INTERVIEWER.	122	1.41	17	1.61
PRODUCTION MANAGER.	88	1.02	23	2.18
PSYCHOLOGIST.	351	4.05	46	4.36
RADIO/TV ANNOUNCER.	7	0.08	1	0.09
REHABILITATION COUNSELOR.	310	3.58	46	4.36
RECEPTIONIST.	4	0.05	0	0.00
REAL ESTATE AGENT	4	0.05	1	0.09
NURSE, REGISTERED.	19	0.22	1	0.09
RESPIRATORY THERAPIST.	12	0.14	2	0.19
RETAIL STORE MANAGER.	32	0.37	10	0.95
RADIO/TV SERVICE TECHNICIAN.	0	0.00	0	0.00
RECREATION WORKER.	48	0.55	10	0.95
SYSTEMS ANALYST	38	0.44	2	0.19
SOIL CONSERVATIONIST.	152	1.75	33	3.13
SECURITIES BROKER.	61	0.70	13	1.23
SECRETARY.	21	0.24	3	0.28
SCHOOL COUNSELOR.	296	3.41	28	2.66
STATISTICIAN.	21	0.24	6	0.57
SOCIAL SERVICE AIDE.	21	0.24	3	0.28
SPEECH PATHOLOGIST/AUDIOLOGIST.	248	2.86	25	2.37
SINGER AND SINGING TEACHER.	11	0.13	1	0.09
SURVEYOR.	14	0.16	2	0.19
SOCIAL WORKER.	84	0.97	11	1.04
TEACHER AIDE.	9	0.10	1	0.09
TELEPHONE CRAFTSWORKER.	0	0.00	0	0.00
TOOL AND DIE MAKER.	5	0.06	0	0.00
TEACHER, ELEMENTARY SCHOOL	112	1.29	5	0.47
ZOOLOGIST.	52	0.60	6	0.57
TECHNICAL WRITER.	2	0.02	2	0.19
TYPIST.	2	0.02	0	0.00

Table E16 (continued)

URBAN PLANNER.	143	1.65	19	1.80
VETERINARIAN.	76	0.88	16	1.52
WASTEWATER TREATMENT OPERATOR.	0	0.00	0	0.00
X-RAY TECHNOLOGIST.	2	0.02	0	0.00
TEACHER, ART.	193	2.23	12	1.14
TEACHER, BIOLOGY.	172	1.98	7	0.66
TEACHER, BUSINESS.	172	1.98	6	0.57
TEACHER, ENGLISH/LANG. ARTS.	142	1.64	5	0.47
TEACHER, FOREIGN LANGUAGE.	142	1.64	5	0.47
TEACHER, HISTORY/SOCIAL STUDIES.	142	1.64	5	0.47
TEACHER, INDUS. ARTS/VOC.TECH.	108	1.25	3	0.28
TEACHER, MATHEMATICS.	172	1.98	7	0.66
TEACHER, PHYSICAL EDUCATION.	68	1.02	3	0.28
TEACHER, PHYSICAL SCIENCE.	172	1.98	7	0.66
WELDER.	0	0.00	0	0.00
AEROSPACE ENGINEER.	11	0.13	1	0.09
FIREFIGHTER.	12	0.14	1	0.09
KEYPUNCH OPERATOR.	0	0.00	0	0.00
LANDSCAPE ARCHITECT.	72	0.83	9	0.85
OPERATING ROOM TECHNICIAN.	0	0.00	0	0.00
OPTOMETRIST.	194	2.24	24	2.28
TEACHER, EARLY CHILDHOOD.	22	0.25	1	0.09
TEACHER, SPECIAL EDUCATION.	142	1.64	5	0.47
CONSTRUCTION INSPECTOR.	32	0.37	1	0.09
CORRECTION OFFICER.	1	0.01	0	0.00
GEOLOGIST.	27	0.31	3	0.28
HOSPITAL ADMINISTRATOR.	113	1.30	20	1.90
PHYSICIAN'S ASSISTANT.	30	0.35	3	0.28
STENOGRAPHER.	3	0.03	0	0.00
EEG TECHNOLOGIST.	0	0.00	0	0.00
NURSING ASSISTANT.	0	0.00	0	0.00
FLORIST (RETAIL & DESIGNER).	2	0.02	2	0.19
TEACHER, VOCATIONAL/TECHNICAL.	52	0.60	3	0.28
CHEF/COOK.	3	0.03	1	0.09
PLUMBER.	23	0.27	2	0.19
FOOD SCIENTIST/TECHNOLOGIST.	11	0.13	1	0.09
TELEVISION PRODUCER/DIRECTOR.	14	0.16	4	0.38
INTERPRETER/TRANSLATOR.	36	0.42	0	0.00
LEGAL ASSISTANT.	11	0.13	0	0.00
FARMER/FARM MANAGER.	3	0.03	1	0.09

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[a] Retrievals for novices.

[b] Retrievals for initiates.

Table E17

OCCUPATIONS IN COMPARE (N= 3039ᵃ)	FREQ	%
ACTOR AND ACTRESS.	20	0.66
ADVERTISING COPYWRITER.	22	0.72
AIR COND, REFRIG, & HEAT MECH.	8	0.26
ACCOUNTANT.	41	1.35
AIRCRAFT MECHANIC.	6	0.20
APPLIANCE REPAIR TECHNICIAN.	0	0.00
ARCHITECT.	17	0.56
AUTOMOBILE SALESWORKER.	2	0.07
ARCH. TECH. AND DRAFTSMAN.	2	0.07
AVIONICS TECHNICIAN.	1	0.03
AUTOMOBILE MECHANIC.	9	0.30
ACTUARY.	13	0.43
BROADCAST TECHNICIAN.	7	0.23
BEAUTICIAN.	10	0.33
BOTANIST.	17	0.56
BOOKKEEPER.	12	0.39
BUSINESS MACHINE REPAIR TECH.	4	0.13
BANK OFFICER.	25	0.82
BANK TELLER.	11	0.36
COMMERCIAL ARTIST.	18	0.59
CLOTHING DESIGNER.	4	0.13
CHEMICAL ENGINEER.	12	0.39
CHEMIST.	11	0.36
CLERGY.	31	1.02
COMPUTER OPERATOR.	20	0.66
COMPUTER PROGRAMMER.	39	1.28
CIVIL ENGINEER.	40	1.32
DENTAL ASSISTANT	5	0.16
DENTIST	28	0.92
DENTAL HYGIENIST	6	0.20
DRAFTERSMAN	11	0.36
DIETITIAN	20	0.66
DIESEL MECHANIC	13	0.43
DANCER AND DANCING TEACHER	8	0.26
ECONOMIST	11	0.36
ELECTRICAL ENGINEER	14	0.46
ENGINEERING TECHNICIAN	7	0.23
ELECTRONICS TECHNICIAN	7	0.23
FINE ARTIST/PRIVATE ART TEACHER	15	0.49
FUNERAL DIRECTOR	9	0.30
FLIGHT ENGINEER	5	0.16
FLIGHT ATTENDANT	21	0.69
FORESTER	36	1.18
GEOGRAPHER	4	0.13
HOME ECONOMIST	41	1.35
HOTEL/MOTEL MANAGER	27	0.89
INSURANCE AGENT	12	0.39
INTERIOR DESIGNER/DECORATOR	25	0.82
INDUSTRIAL ENGINEER	37	1.22
INDUSTRIAL TRAFFIC MANAGER	4	0.13
INDUSTRIAL DESIGNER	19	0.63
INSTRUMENT REPAIR TECHNICIAN	1	0.03
SCIENCE LAB TECHNICIAN	3	0.10
LIBRARIAN	19	0.63

Table E17 (continued)

LABOR RELATIONS SPECIALIST	39	1.28
LIBRARY TECHNICIAN	1	0.03
LAWYER	118	3.88
MATHEMATICIAN	14	0.46
PHYSICIAN	46	1.51
MECHANICAL ENGINEER	22	0.72
METEOROLOGIST	5	0.16
MEDICAL RECORD ADMINISTRATOR	14	0.46
MEDICAL LAB TECHNICIAN	8	0.26
MODEL	11	0.36
MARKET RESEARCHER	11	0.36
MANUFACTURER'S SALESWORKER.	6	0.20
MEDICAL TECHNOLOGIST.	10	0.33
MUSICIAN/MUSIC TEACHER.	8	0.26
MACHINIST.	2	0.07
NURSERYMAN/LANDSCAPER.	13	0.43
NEWSPAPER REPORTER.	31	1.02
OCEANOGRAPHER.	31	1.02
OPTICIAN.	3	0.10
OCCUPATIONAL THERAPIST.	66	2.17
PURCHASING AGENT.	21	0.69
POLICE OFFICER.	19	0.63
PUBLIC HEALTH SPECIALITST.	24	0.79
PILOT.	23	0.76
POLITICAL SCIENTIST.	34	1.12
PHARMACIST.	15	0.49
NURSE, PRACTICAL.	3	0.10
PHOTOGRAPHER.	41	1.35
PUBLIC RELATIONS WORKER.	27	0.89
PHYSICIST.	8	0.26
PHYSICAL THERAPIST.	37	1.22
PERSONNEL INTERVIEWER.	61	2.01
PRODUCTION MANAGER.	34	1.12
PSYCHOLOGIST.	143	4.71
RADIO/TV ANNOUNCER.	25	0.82
REHABILITATION COUNSELOR.	107	3.52
RECEPTIONIST.	12	0.39
REAL ESTATE AGENT	11	0.36
NURSE, REGISTERED.	20	0.66
RESPIRATORY THERAPIST.	5	0.16
RETAIL STORE MANAGER.	20	0.66
RADIO/TV SERVICE TECHNICIAN.	9	0.30
RECREATION WORKER.	23	0.76
SYSTEMS ANALYST	9	0.30
SOIL CONSERVATIONIST.	37	1.22
SECURITIES BROKER.	22	0.72
SECRETARY.	24	0.79
SCHOOL COUNSELOR.	147	4.84
STATISTICIAN.	9	0.30
SOCIAL SERVICE AIDE.	18	0.59
SPEECH PATHOLOGIST/AUDIOLOGIST.	63	2.07
SINGER AND SINGING TEACHER.	8	0.26
SURVEYOR.	2	0.07
SOCIAL WORKER.	46	1.51
TEACHER AIDE.	9	0.30
TELEPHONE CRAFTSWORKER.	1	0.03
TOOL AND DIE MAKER.	5	0.16
TEACHER, ELEMENTARY SCHOOL	34	1.12
ZOOLOGIST.	31	1.02
TECHNICAL WRITER.	5	0.16

Table E17 (continued)

TYPIST.	6	0.20
URBAN PLANNER.	30	0.99
VETERINARIAN.	21	0.69
WASTEWATER TREATMENT OPERATOR.	1	0.03
X-RAY TECHNOLOGIST.	10	0.33
TEACHER, ART.	24	0.79
TEACHER, BIOLOGY.	9	0.30
TEACHER, BUSINESS.	17	0.56
TEACHER, ENGLISH/LANG. ARTS.	23	0.76
TEACHER, FOREIGN LANGUAGE.	18	0.59
TEACHER, HISTORY/SOCIAL STUDIES.	41	1.35
TEACHER, INDUS. ARTS/VOC.TECH.	23	0.76
TEACHER, MATHEMATICS.	14	0.46
TEACHER, PHYSICAL EDUCATION.	48	1.58
TEACHER, PHYSICAL SCIENCE.	12	0.39
WELDER.	3	0.10
AEROSPACE ENGINEER.	7	0.23
FIREFIGHTER.	6	0.20
KEYPUNCH OPERATOR.	2	0.07
LANDSCAPE ARCHITECT.	23	0.76
OPERATING ROOM TECHNICIAN.	4	0.13
OPTOMETRIST.	22	0.72
TEACHER, EARLY CHILDHOOD.	21	0.69
TEACHER, SPECIAL EDUCATION.	63	2.07
CONSTRUCTION INSPECTOR.	15	0.49
CORRECTION OFFICER.	12	0.39
GEOLOGIST.	20	0.66
HOSPITAL ADMINISTRATOR.	23	0.76
PHYSICIAN'S ASSISTANT.	17	0.56
STENOGRAPHER.	5	0.16
EEG TECHNOLOGIST.	1	0.03
NURSING ASSISTANT.	2	0.07
FLORIST (RETAIL & DESIGNER).	6	0.20
TEACHER, VOCATIONAL/TECHNICAL.	4	0.13
CHEF/COOK.	2	0.07
PLUMBER.	1	0.03
FOOD SCIENTIST/TECHNOLOGIST.	1	0.03
TELEVISION PRODUCER/DIRECTOR.	6	0.20
INTERPRETER/TRANSLATOR.	6	0.20
LEGAL ASSISTANT.	8	0.26
FARMER/FARM MANAGER.	1	0.03

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[a] Frequency indicates the total number of times an occupation was selected as a subject for inquiry by novices and initiates.

Table E18

QUESTIONS IN COMPARE (N= 7207[a])	FREC	%
DEFINITION OF OCCUPATION?	501	6.95
DESCRIPTION OF WORK ACTIVITIES?	523	7.26
LEVELS OF SKILLS?	289	4.01
WHERE TO GET MORE INFORMATION?	252	3.50
EDUCATION REQUIRED-EARLY ENTRY?	514	7.13
SPECIFIC OCCUPATIONAL TRAINING?	282	3.91
RELATED COLLEGE COURSES?	270	3.75
PERSONAL QUALIFICATIONS?	353	4.90
OTHER REQUIREMENTS?	168	2.33
BEGINNING SALARY?	456	6.33
AVERAGE INCOME-HIGH INCOME?	344	4.77
TOP SALARY POSSIBILITIES?	227	3.15
HOW SALARIES VARY?	145	2.01
OPPORTUNITIES TO HELP OTHERS?	134	1.86
OPPORTUNITIES FOR LEADERSHIP?	85	1.18
WHAT FIELDS OF INTEREST?	256	3.55
PRESTIGE LEVEL?	96	1.33
SPECIAL PROBLEMS?	248	3.44
PHYSICAL SURROUNDINGS?	128	1.78
LEISURE-HOURS?	220	3.05
INDEPENDENCE ON THE JOB?	166	2.30
VARIETY?	162	2.25
FRINGE BENEFITS?	162	2.25
EMPLOYMENT OUTLOOK?	400	5.55
WHERE ARE THE JOBS?	322	4.47
JOB SECURITY?	190	2.64
ADVANCEMENT?	172	2.39
HOW MANY WOMEN?	142	1.97

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[a] Frequency is the total number of times the question was chosen by novices and initiates.

Table E19

Students' Reports of Their Previous Academic Performance

H.S. RANK (N= 76)	FREQ	%
TOP FIFTH.	13	17.11
2ND FIFTH.	31	40.79
3RD FIFTH.	26	34.21
4TH FIFTH.	4	5.26
BOTTOM FIFTH.	2	2.63

H.S. MATH GRADES (N= 76)	FREQ	%
MOSTLY A'S.	13	17.11
MOSTLY B'S.	25	32.89
MOSTLY C'S.	29	38.16
BELOW C.	9	11.84

H.S. ENGLISH GRADES (N= 76)	FREQ	%
MOSTLY A'S.	33	43.42
MOSTLY B'S.	30	39.47
MOSTLY C'S.	11	14.47
BELOW C.	2	2.63

HELP WITH ENGLISH (N= 76)	FREQ	%
YES.	21	27.63
NO.	46	60.53
NOT SURE.	9	11.84

Table E20

Programs Chosen in Prediction (N = 221[a])

	FREQ	%
Accounting Technician	5	2.26
Air Conditioning and Refrigeration	3	1.36
Anthropology	9	4.07
Architecture	7	3.17
Art	6	2.71
Biology	11	4.98
Business	24	10.86
Chemistry	7	3.17
Computer	12	5.43
Data Programmer	7	3.17
Drafting and Design	4	1.81
Elementary Education	5	2.26
Engineering	2	.90
English	11	4.98
Language	6	2.71
Government	8	3.62
Health Fields	11	4.98
History	6	2.71
Home Economics	5	2.26
Law	18	8.14
Math	8	3.62
Medicine	9	4.07
Music	1	.45
Physics	6	2.71
Secretarial	6	2.71
Sociology	17	7.69
Speech	4	1.80
Veterinarian	3	1.36

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[a] The n represents the sum of the individual frequencies, not students.

Table E21

QUESTIONS IN PREDICTION (N= 28)	FREQ	%
CHANCES IN 100 MEAN?	5	17.86
CHANCES OF PASSING COURSE?	8	28.57
HOW TO PREDICT GRADE.	7	25.00
CHANCES GOOD OR BAD.	1	3.57
SIGI RIGHT OR AM I RIGHT?	7	25.00

Table E22

1ST CHOICE OCCUPATION IN STRATEGY - PRE[a] & POST[b](N= 382 & 348)

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	3	0.79	3	0.86
ADVERTISING COPYWRITER.	4	1.05	0	0.00
AIR COND, REFRIG, & HEAT MECH.	1	0.26	1	0.29
ACCOUNTANT.	13	3.40	11	3.16
AIRCRAFT MECHANIC.	0	0.00	0	0.00
APPLIANCE REPAIR TECHNICIAN.	0	0.00	0	0.00
ARCHITECT.	3	0.79	1	0.29
AUTOMOBILE SALESWORKER.	0	0.00	0	0.00
ARCH. TECH. AND DRAFTSMAN.	0	0.00	0	0.00
AVIONICS TECHNICIAN.	0	0.00	1	0.29
AUTOMOBILE MECHANIC.	4	1.05	6	1.72
ACTUARY.	2	0.52	1	0.29
BROADCAST TECHNICIAN.	0	0.00	0	0.00
BEAUTICIAN.	0	0.00	0	0.00
BOTANIST.	2	0.52	1	0.29
BOOKKEEPER.	2	0.52	1	0.29
BUSINESS MACHINE REPAIR TECH.	0	0.00	0	0.00
BANK OFFICER.	3	0.79	4	1.15
BANK TELLER.	2	0.52	1	0.29
COMMERCIAL ARTIST.	2	0.52	0	0.00
CLOTHING DESIGNER.	1	0.26	1	0.29
CHEMICAL ENGINEER.	0	0.00	1	0.29
CHEMIST.	2	0.52	0	0.00
CLERGY.	8	2.09	6	1.72
COMPUTER OPERATOR.	1	0.26	0	0.00
COMPUTER PROGRAMMER.	3	0.79	2	0.57
CIVIL ENGINEER.	3	0.79	7	2.01
DENTAL ASSISTANT	1	0.26	1	0.29
DENTIST	3	0.79	6	1.72
DENTAL HYGIENIST	1	0.26	0	0.00
DRAFTERSMAN	2	0.52	1	0.29
DIETITIAN	0	0.00	0	0.00
DIESEL MECHANIC	3	0.79	1	0.29
DANCER AND DANCING TEACHER	0	0.00	1	0.29
ECONOMIST	1	0.26	2	0.57
ELECTRICAL ENGINEER	3	0.79	1	0.29
ENGINEERING TECHNICIAN	0	0.00	0	0.00
ELECTRONICS TECHNICIAN	3	0.79	1	0.29
FINE ARTIST/PRIVATE ART TEACHER	5	1.31	6	1.72
FUNERAL DIRECTOR	2	0.52	2	0.57
FLIGHT ENGINEER	1	0.26	0	0.00
FLIGHT ATTENDANT	3	0.79	1	0.29
FORESTER	4	1.05	5	1.44
GEOGRAPHER	0	0.00	0	0.00
HOME ECONOMIST	2	0.52	3	0.86
HOTEL/MOTEL MANAGER	2	0.52	2	0.57
INSURANCE AGENT	0	0.00	2	0.57
INTERIOR DESIGNER/DECORATOR	8	2.09	3	0.86
INDUSTRIAL ENGINEER	4	1.05	5	1.44
INDUSTRIAL TRAFFIC MANAGER	1	0.26	1	0.29
INDUSTRIAL DESIGNER	1	0.26	1	0.29
INSTRUMENT REPAIR TECHNICIAN	0	0.00	0	0.00
SCIENCE LAB TECHNICIAN	0	0.00	0	0.00
LIBRARIAN	5	1.31	4	1.15
LABOR RELATIONS SPECIALIST	3	0.79	4	1.15
LIBRARY TECHNICIAN	0	0.00	0	0.00

Table E22 (continued)

LAWYER	21	5.50	22	6.32
MATHEMATICIAN	0	0.00	0	0.00
PHYSICIAN	10	2.62	10	2.87
MECHANICAL ENGINEER	3	0.79	2	0.57
METEOROLOGIST	2	0.52	0	0.00
MEDICAL RECORD ADMINISTRATOR	1	0.26	1	0.29
MEDICAL LAB TECHNICIAN	3	0.79	3	0.86
MODEL	1	0.26	0	0.00
MARKET RESEARCHER	2	0.52	1	0.29
MANUFACTURER'S SALESWORKER.	2	0.52	2	0.57
MEDICAL TECHNOLOGIST.	1	0.26	0	0.00
MUSICIAN/MUSIC TEACHER.	2	0.52	3	0.86
MACHINIST.	0	0.00	0	0.00
NURSERYMAN/LANDSCAPER.	3	0.79	1	0.29
NEWSPAPER REPORTER.	1	0.26	1	0.29
OCEANOGRAPHER.	4	1.05	3	0.86
OPTICIAN.	0	0.00	0	0.00
OCCUPATIONAL THERAPIST.	6	1.57	7	2.01
PURCHASING AGENT.	1	0.26	0	0.00
POLICE OFFICER.	5	1.31	3	0.86
PUBLIC HEALTH SPECIALITST.	0	0.00	2	0.57
PILOT.	4	1.05	3	0.86
POLITICAL SCIENTIST.	1	0.26	4	1.15
PHARMACIST.	1	0.26	0	0.00
NURSE, PRACTICAL.	1	0.26	0	0.00
PHOTOGRAPHER.	4	1.05	1	0.29
PUBLIC RELATIONS WORKER.	2	0.52	0	0.00
PHYSICIST.	1	0.26	1	0.29
PHYSICAL THERAPIST.	5	1.31	3	0.86
PERSONNEL INTERVIEWER.	3	0.79	6	1.72
PRODUCTION MANAGER.	3	0.79	3	0.86
PSYCHOLOGIST.	31	8.12	21	6.03
RADIO/TV ANNOUNCER.	4	1.05	2	0.57
REHABILITATION COUNSELOR.	14	3.66	17	4.89
RECEPTIONIST.	2	0.52	3	0.86
REAL ESTATE AGENT	1	0.26	1	0.29
NURSE, REGISTERED.	9	2.36	6	1.72
RESPIRATORY THERAPIST.	0	0.00	1	0.29
RETAIL STORE MANAGER.	2	0.52	2	0.57
RADIO/TV SERVICE TECHNICIAN.	0	0.00	0	0.00
RECREATION WORKER.	1	0.26	1	0.29
SYSTEMS ANALYST	0	0.00	1	0.29
SOIL CONSERVATIONIST.	4	1.05	4	1.15
SECURITIES BROKER.	3	0.79	2	0.57
SECRETARY.	3	0.79	3	0.86
SCHOOL COUNSELOR.	18	4.71	20	5.75
STATISTICIAN.	0	0.00	0	0.00
SOCIAL SERVICE AIDE.	5	1.31	4	1.15
SPEECH PATHOLOGIST/AUDIOLOGIST.	2	0.52	3	0.86
SINGER AND SINGING TEACHER.	0	0.00	0	0.00
SURVEYOR.	0	0.00	1	0.29
SOCIAL WORKER.	5	1.31	6	1.72
TEACHER AIDE.	1	0.26	0	0.00
TELEPHONE CRAFTSWORKER.	0	0.00	0	0.00
TOOL AND DIE MAKER.	0	0.00	0	0.00
TEACHER, ELEMENTARY SCHOOL	9	2.36	5	1.44
ZOOLOGIST.	1	0.26	1	0.29
TECHNICAL WRITER.	0	0.00	0	0.00
TYPIST.	0	0.00	0	0.00
URBAN PLANNER.	1	0.26	1	0.29

Table E22 (continued)

VETERINARIAN.	1	0.26	2	0.57
WASTEWATER TREATMENT OPERATOR.	0	0.00	0	0.00
X-RAY TECHNOLOGIST.	1	0.26	1	0.29
TEACHER, ART.	1	0.26	3	0.86
TEACHER, BIOLOGY.	1	0.26	1	0.29
TEACHER, BUSINESS.	2	0.52	1	0.29
TEACHER, ENGLISH/LANG. ARTS.	1	0.26	1	0.29
TEACHER, FOREIGN LANGUAGE.	2	0.52	3	0.86
TEACHER, HISTORY/SOCIAL STUDIES.	1	0.26	3	0.86
TEACHER, INDUS. ARTS/VOC.TECH.	2	0.52	4	1.15
TEACHER, MATHEMATICS.	2	0.52	0	0.00
TEACHER, PHYSICAL EDUCATION.	12	3.14	13	3.74
TEACHER, PHYSICAL SCIENCE.	0	0.00	1	0.29
WELDER.	0	0.00	0	0.00
AEROSPACE ENGINEER.	0	0.00	0	0.00
FIREFIGHTER.	1	0.26	1	0.29
KEYPUNCH OPERATOR.	0	0.00	0	0.00
LANDSCAPE ARCHITECT.	1	0.26	2	0.57
OPERATING ROOM TECHNICIAN.	1	0.26	1	0.29
OPTOMETRIST.	2	0.52	1	0.29
TEACHER, EARLY CHILDHOOD.	6	1.57	3	0.86
TEACHER, SPECIAL EDUCATION.	8	2.09	9	2.59
CONSTRUCTION INSPECTOR.	0	0.00	0	0.00
CORRECTION OFFICER.	2	0.52	2	0.57
GEOLOGIST.	2	0.52	2	0.57
HOSPITAL ADMINISTRATOR.	4	1.05	3	0.86
PHYSICIAN'S ASSISTANT.	3	0.79	3	0.86
STENOGRAPHER.	0	0.00	0	0.00
EEG TECHNOLOGIST.	0	0.00	0	0.00
NURSING ASSISTANT.	0	0.00	0	0.00
FLORIST (RETAIL & DESIGNER).	0	0.00	0	0.00
TEACHER, VOCATIONAL/TECHNICAL.	0	0.00	0	0.00
CHEF/COOK.	0	0.00	0	0.00
PLUMBER.	0	0.00	0	0.00
FOOD SCIENTIST/TECHNOLOGIST.	0	0.00	0	0.00
TELEVISION PRODUCER/DIRECTOR.	0	0.00	1	0.29
INTERPRETER/TRANSLATOR.	1	0.26	0	0.00
LEGAL ASSISTANT.	2	0.52	2	0.57
FARMER/FARM MANAGER.	0	0.00	0	0.00

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[a] "Pre" (first two columns) means first choice before the student received information about the rewards and risks associated with the occupation.

[b] "Post" (third and fourth columns) means first choice after receiving information about rewards and risks.

Table E23

Designation of First-Choice Occupations in Strategy with Respect to Desirability Sums and Estimated Chances for Entry

DESIRABILITY OUTCOME (N = 372)	FREQ	%
OCCUPATION WITH THE HIGHEST SUM.	152	40.86
WITHIN 10 POINTS OF THE HIGHEST.	76	20.43
MORE THAN 10 POINTS BELOW HIGHEST.	144	38.71

WHICH STRATEGY (N = 351)	FREQ	%
SUM HIGH;[a] CHANCES HIGH.	142	40.46
SUM HIGH;[a] CHANCES LOW.[b]	90	25.64
SUM LOW;[c] CHANCES HIGH.	64	18.23
SUM LOW;[c] CHANCES LOW.[b]	21	5.98
SUM HIGH;[a] CHANCES EQUAL.	26	7.41
SUM LOW;[c] CHANCES EQUAL.	8	2.28

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[a] Sum High means that the occupation had the highest Desirability Sum or came within 10 points of the highest sum.

[b] Chances Low means "chances not high"; i.e., the student estimated better chances for some other occupation in the set of three. Low does not necessarily mean lowest.

[c] Sum Low means that the Desirability Sum was not the highest or within 10 points of the highest. It does not mean that the Desirability Sum was necessarily the lowest of the three sums under consideration.

CHAPTER IX

FINDINGS AT DELTA COLLEGE

Description of College, Computer Configuration, and Career Counseling Services

Delta College is a public, tax-supported community college serving three counties in Michigan's Saginaw Valley. More than 12,000 students are enrolled in Delta's academic and community education programs. Most attend classes at the college's 640-acre main campus in University Center, Michigan; however, Delta also offers a broad selection of courses at its 28 off-campus locations. About half of the students are enrolled in associate degree or certificate terminal occupational programs and the other half are enrolled in programs designed for transfer to a senior institution.

Computer Configuration

Delta runs SIGI on a PDP 11/50 based RSTS/E system. This system has 16K words of high speed MOS memory and 80K words of core memory, for a total of 96K words of memory. Disk storage is provided by two RP04 88-million-byte disk drives. The system is also equipped with a TU16 800/1600 bpi 9-channel magnetic tape drive and an LP11-VA 300-line-per-minute printer. Three terminals are currently dedicated to SIGI and a fourth terminal will be added in the summer of 1977. In addition, there are eight local terminals and five dial-up ports connected to the computer through a DH11 multiplexer.

The computer is located in the main computer room in the administration and classroom building. The SIGI terminals, about 1,500 feet away, are connected using Tran short-haul modems at 2400 baud. Each terminal is equipped with a Texas Instrument 30-character-per-second thermal printer. The SIGI software was installed in February 1976.

The RSTS system is operated by the administrative data processing staff under the supervision of the Director of Data Processing. In addition to SIGI, the RSTS system is used for on-line registration, admissions and scheduling, and by students taking courses in data processing, economics, basic science, and math, as well as computer assisted instruction. Students write programs in BASIC-Plus and Fortran IV.

How reliable is this hardware configuration? To find out, we asked the test sites to keep two logs from September 1 to December 1, 1976, one by the computer operators and the other by the SIGI monitors, describing each hardware problem and, if possible, identifying its source. The logs of the computer operators were sent to ETS every time there was a problem; the logs of the SIGI monitors were collected at the end of the test period.

During the time the logs were kept there were no problems beyond what might be expected in any computer system the size of SIGI. All the components are standard, off-the-shelf equipment requiring no modification for SIGI. Problems were taken care of by means of routine service procedures.

The only operational problems during the period before logs were kept were related to the experimental data collection. These were resolved.

Career Counseling Services

Description of counseling department. Delta's Counseling Center is staffed by 11 professionally trained counselors and 2 3/5 counselor aides. The staff assists individuals with academic, vocational, and personal problems. On the basis of a preliminary interview, students at Delta are assigned to counselors associated with a particular academic or career program or to counselors responsible for students who are unsure of their academic or career goals.

In addition to working with students on an individual basis, Delta's counseling staff conducts special group counseling sessions. Vocational Exploration Groups (VEG) are offered without charge to Delta students and the general public. During these 2-1/2 hour group sessions, partipants learn decision-making skills, identify appropriate career goals, and find out about sources of career information. Counselors also teach several one-credit courses designed to help students with their personal, educational, and career plans. These include Personal Career Patterns, Personal Value Clarification, Personal Decision-Making, Behavior Change through Self Awareness, Human Potential, and Techniques of Effective Interaction for Allied Health Professionals.

Delta offers several other options for career explorations as well. Students who want first-hand information about an occupation they are considering can take advantage of Delta's Community and College Referral Services. Many Delta alumni, faculty, and staff have expressed a willingness to discuss their occupations with Delta students and to share information they have about educational and career opportunities.

For on-the-job experience, students can sign up for one of the Experiential Learning Opportunities. These programs provide students with volunteer and paying jobs directly related to their major fields of study.

The Counseling Center staff makes available to students a variety of tests and inventories designed to help them determine where their career interests lie.

A workshop was held for counselors in May 1976. A member of the SIGI staff explained the theory behind SIGI, answered counselors' questions, and addressed their concerns.

Role of SIGI in counseling program. SIGI is an integral part of Delta's career guidance program. Delta's Career Information Center (CIC), made possible by an AIDP grant, houses the college's career reference books and pamphlets, occupation files, college catalogs, and career-related audiovisual equipment and materials. It is also home for Delta's three SIGI terminals, which are placed side by side in a well-lit area, separated by partitions from the rest of the Center. The partitions help reduce noise and other distractions, and also provide privacy for students as they work at the terminals.

Established in the fall of 1975, the CIC was used by over 2,400 students during its first six months of operation. A staff member is always on hand in the CIC to help students locate career information and, if necessary, to refer them to other career development services at the college.

SIGI has been incorporated into one of the courses offered by Delta counselors, Personal Career Patterns. This one-credit elective was offered for the first time in the fall of 1975. SIGI was added to the course activities in October 1976. In addition to using SIGI, students who sign up for Personal Career Patterns take at least two occupational interest inventories. Afterward, they must research and write essays about five occupations from those interest inventories. As a final exercise, they are required to select one of the five occupations and write a paper defending that occupation as a career choice.

Students taking Delta's Career/Life Planning course were also being referred to SIGI, beginning in the fall of 1976. This course is part of Delta's Community Education program and is taken primarily by women who are returning to college after several years' break in their education.

Two groups of students who have already made tentative decisions about the fields they will enter are required to use SIGI in courses dealing with career opportunities in those fields. Pre-engineering students in Delta's Engineering Opportunities course go through SIGI and then write research papers on four engineering specialties that interest them. Operating Room Technician (ORT) students are expected to use SIGI to find out about other occupations they might go into should they decide later that ORT is not for them.

Finally, instructors in Business Communications recommend that their students make appointments with SIGI. Students in this beginning business course use the system to explore business careers. In addition, their SIGI experience becomes the topic for an exercise in report writing.

At Delta, the Chairman of the Counseling Department and a professional counselor have overseen the SIGI project. One coordinated data collection for Delta's Prediction system and the other handled the college's Planning system.

Shortly after SIGI was installed at Delta, the counseling staff hired and trained a counselor aide to work exclusively with SIGI. The aide's duties include planning and running orientation sessions for first-time SIGI users, scheduling appointments, getting students signed on, and helping them with questions or problems that come up as they use SIGI. The counselor aide's desk is just a few steps from the SIGI terminals, making her readily available to students who need assistance.

At the time of the site visit in October 1976, SIGI was in operation Monday through Thursday from 8:00 a.m. to 8:00 p.m. and on Friday from 8:00 a.m. to 4:00 p.m. Students were advised to schedule one-hour blocks of time, and most followed this recommendation. Because Delta had three terminals, scheduling was rarely a problem. Students were usually able to get an appointment the same week (and sometimes even the same day) they came in to sign up. They were given specially designed appointment slips reminding them of the date and time of their appointments. The slips, which bore the SIGI logo, also gave students the number to call if they had to cancel an appointment. In most instances, a vacated slot was quickly filled by another student. Thus, the SIGI terminals have been used at a rate of over 120 students a week.

Before scheduling their first appointment, Delta students who were not using SIGI as part of a course were required to attend an orientation session run by the counselor aide. Each session was attended by about ten students and ran for approximately 30 minutes. During this time, the aide gave a short demonstration of how to operate the terminal keyboard. She also explained to students what they would do and what information they would get in each of the SIGI subsystems. At the end of the orientation session, students were given an opportunity to sign up for their first appointments with SIGI.

The counseling staff began to publicize SIGI during the first few weeks of the Fall 1976 term. Students officially classified as "undecided" were among the first to be notified about SIGI. All 1,700 of those students were sent a letter describing SIGI and inviting them to use the system.

The counseling staff also wrote announcements for the daily Student Bulletin and prepared an article for the campus newspaper. A handout describing each of the SIGI subsystems was posted on bulletin boards throughout the campus, and copies were made available to students in the Career Information Center and at various other locations. Counselors and faculty members also publicized SIGI in the courses they taught, as mentioned earlier.

Impact on Students

To measure the impact of SIGI on its users, we interviewed a few students at each college who had gone through SIGI, and we had questionnaires administered to a sample of SIGI users (experimentals) and a sample of control students. Ideally, the controls were to be selected from the population of students who had expressed an interest in using SIGI but had not yet started their interaction, but it was not always possible to meet this requirement at all colleges. The colleges themselves selected the sample of students to be interviewed and administered the control and experimental questionnaires in accordance with our guidelines. (See Appendix D, letter to the college.) This section of this chapter discusses our findings from these instruments at Delta College.

SIGI had been in use for only six weeks at the time of the site visit. Nevertheless, there had been few problems during the shakedown period, and a large enough number of students had used the system to provide a sample for interviewing. The interviews were conducted on campus and were tape recorded.

With regard to the questionnaires, the college gave questionnaires to students who had completed SIGI. Questionnaires were returned from 56 students in this group. SIGI had been in operation for such a short time that it was impossible to select as controls a large sample from the population of students who intended to use SIGI but had not yet been scheduled. Therefore the control sample consisted of a random cross-section of 75 freshmen and a random cross-section of 75 sophomores. Questionnaires were returned from 119 students in this group. No significant differences were found between the two groups in age, sex, or year in college.

Interviews

The interview sample consisted of eight men and three women, mostly in their first year at Delta. Their ages ranged from 18 to 30. Seven had used SIGI in conjunction with the Personal Career Patterns course, three had been referred by the instructor for Engineering Opportunities, and one had been referred by a counselor.

All of these students thought they had benefited from SIGI. None, however, turned out to be a particularly dramatic "case history," and we have decided that the best way to describe the impact of SIGI on them would be to pool their experiences and show their composite reactions system by system.

Values system. The 11 Delta students indicated that the exercise presented in the Values system was both novel and useful. Most said that they had never thought much about their values before using SIGI, and they consequently found the forced dichotomous choices in the Values Game to be thought-provoking and sometimes difficult. "I didn't know myself very well," one student said. Another said, "The Values Games tell you whether you're trying to fool youself." The main effect was one of illumination. "I didn't even know I wanted all this," was the comment of another.

The students also found it hard and useful to pare the sum of their weights down to 40. "I had never thought about these things before," one said. "You could have only 40 points," another said; "so you really had to make a choice about which ones were most important."

Perhaps the most interesting feature of the students' reaction to the Values system was the effect it exerted on their manner of thinking.

They began to use their values in other systems, as they were supposed to do, but they also found that what happened in other systems gave them fresh insights into their values. One returned and reweighted his values, this time with confidence that he knew what he was doing. Another said, "When you go through SIGI, at the beginning you're just kind of hanging. But as you continue, SIGI helps you understand what your values are, no matter what system you're in. SIGI helped me understand, 'Gee, that's what I want!'" The habit of structuring their thinking around their values may have been the most important thing these students got out of SIGI.

Locate system. Most of the students used Locate extensively. One, who called Locate "the most helpful system in SIGI," expressed the consensus of the group: that Locate makes manageable the task of selecting an occupation. One said, "You can go to a library of career information and sit down with a catalog full of occupations before you. You flip through the book and there are so many occupations. That's where I get lost. It's mind-boggling. I don't know where to begin."

The tendency to organize thoughts in terms of values appeared in Locate. Several students availed themselves of the opportunity to discover why a particular occupation had not been retrieved. One student, learning that his strict specification for Early Entry had held back the engineering occupations, started to reassess the importance of that value. Another, on discovering why Computer Programmer had not appeared, reexamined his values in light of his great interest in that occupation. A would-be architect found Industrial Engineer on the screen and began thinking of it as an acceptable alternative. A prenursing candidate, who described herself as "a little flaky when it comes to an emergency," began treating this weakness as if it were a SIGI value; she speculated that "maybe dental hygienist or assistant would be a better occupation."

Compare system. We may make three comments about the reactions of these students to Compare:

1. They thought that the system was one of the best sources of occupational information available. Since Delta students have access to an extraordinary number and variety of resources for career information and guidance, they are in a better position than most students to judge the quality of occupational information. One observed that SIGI provided "a lot of information" that he could not have found in the Occupational Outlook Handbook. Another said, "The occupational information in Compare was much better than what I found elsewhere, and I could have it at the touch of a button."

2. The students used Compare extensively. Some of this use was due to assignments made by instructors of courses the students were taking, but much of it was also due to the interest of the students themselves. Several students asked all 28 questions about a number of occupations and took a thick roll of printouts for later reference.

3. Some students used Compare simply to satisfy their curiosity about occupations, even though they did not expect to pursue them. One said, "I just figured I had the chance to get the information, so I took advantage of it. . . . I just went through the list [of questions] and asked about every occupation I had any interest in whatsoever." A second observed, "I don't like to waste a counselor's time asking questions about occupations I'm not that interested in. I'd rather spend time with my counselor talking about my first-choice occupation." This kind of "fooling around" in Compare has sometimes unearthed an occupation that proved attractive.

Prediction system. Information from the Prediction system helped three of the students in their immediate career choice. A woman who was considering becoming an accountant was confirmed in her choice by predictions that looked favorable to her. She liked the Prediction system because she "could put the information down and actually see it." A second student had not settled on an occupation but was leaning toward something in the field of social work. He leaned still farther when he got his prediction for the key course in sociology. This piece of information, added to what he had already learned in Locate and Compare, made him think he was on the right track. The third student expected to become an architect. His prediction did not look good to him, with the result that he resolved to work harder and also to think about contingency occupations that he could fall back on.

For others, the Prediction system did not affect their immediate problem with career choice, but it made them aware that assessment of abilities plays a part in the decision-making process. Some students, unable to get predictions for programs of interest because only 15 predictions were available at the time of the interview, said they wanted to come back to the system when it had been expanded. Others, disappointed by predictions that looked like bad news, said that they were motivated to work hard. Such statements have a familiar ring, especially during the early weeks of a semester. But made in the context of career guidance, they indicate cognizance of one important element of the decision-making process.

Planning system. The students' reaction to the Planning system was similar to their reaction to Compare. They liked it for the quality of the information it gave them and for the immediacy of its usefulness. Two used it to make out schedules before seeing a counselor. One fulfilled a need for instant information about transfer colleges. Another was stimulated by the financial aid displays to seek help with college expenses. Yet another learned that she had to act at once if she expected to get into a course with limited enrollment.

Several students used the Planning system to make choices between occupations they were considering rather than to make plans for entry into an occupation previously chosen. They deliberately explored occupations of only marginal interest or occupations that did not merit a counselor's time for discussion. "Everybody keeps telling me that I should go into physical education," one said. "So just out of curiosity I decided to see what I would have to do for that occupation." Another student said, "When you go to a counselor, you should limit yourself to discussing one occupation. But in Planning you can check out a variety of fields."

Strategy system. The main effect of Strategy on these students was to consolidate their confidence that they had chosen the best occupation. One said, "I was pretty sure [about Funeral Director] before I went through Strategy; but after I finished, I was very sure." Similar comments were made with respect to Respiratory Therapist and occupations in the field of engineering. One student particularly welcomed the opportunity to reweight his values in light of what he had learned about them in other sections of SIGI; he was much more confident about the new weights than he had been about the old ones.

Other students did not single Strategy out as having directly influenced their career planning. For them, the main effects of SIGI were due to the other systems.

Interaction as initiates. Four of the 11 students had already returned to SIGI as initiates at the time of the interview, and all 11 (including the four) planned to do so. One said, "I think the first time through I was just learning what it's all about. Now that I'm going through [as an initiate], I know what it's all about, and I'm exploring occupations all over the place." Compare and Planning were named most often as the systems they would like to return to; they would also like to return to Prediction when more programs are predictable.

Summary. These students all stated that SIGI had had a large effect on their career plans. Two had started their interaction with more or less definite occupational goals and had ended with their choice confirmed but now grounded on information and insights that had been absent before. Two other students had been faced with about equally strong alternatives and had settled on one because of the information and the way to process it that they found in SIGI. Yet two more had narrowed down their options to a manageable size and had made tentative career choices. Four had been completely at sea when they started. They described themselves as "really confused . . . a lost cause . . . completely blank . . . babbling." At the time of the interview, they all said they felt more confident; three had made tentative choices, and the fourth had settled on a major that embraced several occupations he was now considering.

These effects may not have been due to SIGI alone. Seven of the interview subjects were taking the career patterns course; moreover, Delta has a strong commitment to guidance, including a well-stocked career information center and accessible personnel. Whatever the reason, the interviewer saw in these subjects a movement toward a rational method of making career decisions. They sought information, applied a logical method for processing it, and actively put it to use.

Experimental and Control Group Questionnaires

Method of analysis. Separate questionnaires were given to students who had been through SIGI (experimentals) and to students who had not used it (controls). This section of the report covers the responses of Delta College students to the questionnaires. Since questions 1-41 are the same for experimentals and controls, we were able to run tests of significance comparing the responses of the two groups and to present the 41 questions, together with our findings, in a single table, D1. The portions of the questionnaires that are different are in separate tables: questions 42-45 for controls in Table D4 and questions 42-88 for experimentals in Table D5. (The intact questionnaires are in Appendix D.) In all cases the numbers in the tables are percentages unless otherwise indicated.

In the tests of significance, chi-squares were computed for most questions (1-24 and 37-41). In the computation, responses in logically related categories were grouped if the expected cell sizes fell below 5; this is a requirement for chi-square. For questions 25-29, in which students used scales to rate themselves on a variety of dimensions, t-tests were done on the computed group means. Questions 31-34 comprise an information test. Wrong answers for each question were scored 1 and correct answers 2. The four scores were then added and an information test score group mean was computed. It is shown opposite question 30 in Table D1. A t-test was then done on the two means. In reporting the results of all tests of significance, we follow the convention of using a single asterisk for significance at the .05 level and double asterisks for the .01 level.

Several of the questions are open-ended. Responses to these have been placed in separate tables. Tables D2 and D3 list the occupations named by experimental and control students in response to question 30 (What occupation would you like to prepare yourself for eventually?) The responses have been grouped according to whether or not the occupation named was among those already in SIGI. Other responses that could not be quantified appear in Tables D4A, D6, and D7.

Results. Questions 1-3 give a description of the sample in terms of age, sex, and college enrollment. The experimental and control groups do not differ significantly on these dimensions. In both groups, about 70% were between 15 and 22 years old, more than half of the students were women (56% of the controls, 70% of the experimentals), and approximately half were freshmen (67% of the controls, 48% of the experimentals).

Questions 4-10 concern students' assessment of their career decision-making skills. Significant differences ($p < .01$) were found in two of the seven questions: The experimental group (SIGI users) had explored more occupations (question 5), and had more specific career plans (question 9). The groups were not significantly different in their knowledge of rewards and satisfactions to be obtained from an occupation (question 4), in the number of occupations that students thought would provide desired satisfactions (question 6), in the definiteness of their career plans (question 7), in their estimate of their ability to predict grades (question 8), and in their overall confidence in their career decision-making skills (question 10).

Insert Table D1 about here

SIGI also seemed to stimulate activities related to career exploration (questions 11-18). Differences significant at the .01 level were found in responses to three of the questions: More experimentals had used the college career reference library (question 14), used career-related and audio-visual materials (question 17), and, not unexpectedly, had used "a computer-based guidance system" (question 18). Also, at the .05 level of significance, experimentals had read about occupations more often than had controls (question 11). No significant differences were found in the extent to which the two groups talked with friends about careers (question 12), talked with people in the field (question 13), attended career planning workshops (question 15), or talked to a guidance counselor about careers (question 16).

Given the opportunity to agree or disagree with certain statements about choosing an occupation (questions 19-24), students who had used SIGI were not significantly different from the controls. No significant differences were found in the attitudes of the two groups toward following the advice of others, toward the role of chance in career choice, toward conflicting advice, toward determination to make their own decisions, toward the need to know marriage plans, or toward the need to make a career choice soon.

Questions 25 through 29 explored the way students rated themselves as career decision-makers. No significant differences were found between the two groups.

As a check on these self-ratings, four questions were included to test the students' actual knowledge of occupations (questions 30-34). Students were asked to name a first-choice occupation (question 30) and were questioned about the education required, average salary, amount of independence, and employment outlook for that occupation. Tables D2 and D3 list the occupations named by the two groups of Delta students. They show that most of the occupations of interest to both groups are already offered by SIGI. First-choice occupations named by 41 of the 56 students in the experimental group and by 94 of the 120 students in the control group were SIGI occupations. Eight experimentals and nine controls named identifiable occupations not in SIGI. The rest--7 students in the experimental group and 17 in the control--were unable to name a specific occupation or were undecided.

Insert Tables D2 and D3 about here

The replies to question 30 were sometimes difficult to tabulate because students often were unable to identify a specific occupation or to express clearly what they had in mind. We sometimes had to make judgments about a student's meaning. When the staff could not reach agreement, they recorded the answer as Too Vague to Classify. When the occupation named in question 30 was a SIGI occupation, we were in a position to evaluate the accuracy of the students' responses to questions 31-34 for both groups. These four questions constitute an information test, which was scored in the manner described earlier. No significant difference was found between the scores of the two groups at Delta.

Questions 37-41 deal with other career guidance experiences besides SIGI. The two groups were significantly different (at the $\underline{p} < .01$ level) on three items. First a larger percentage of experimentals (76% as opposed to 51% of the controls) had seen a guidance counselor during the last two months (question 37) to discuss various subjects (question 38). Second, a larger proportion of the experimentals (39% as opposed to only 11% of the controls) had taken a career guidance course at Delta (question 39). Third, there was a significant difference in the feelings of the two groups about interacting with a computer for career guidance. Eighty-two percent of the experimentals had a favorable attitude about using a computer for this purpose as opposed to only 50% of the controls (question 41).

The remaining four questions in the questionnaire for the control group explored attitudes toward SIGI. The answers are listed in Table D4. Sixty percent of the controls had heard of SIGI (question 42) and 75% of them wanted to use it (question 45). Few had formed an unfavorable impression of it (question 43). Members of the group had learned about it from a variety of sources, but primarily from counselors or from the control-group questionnaire (question 44). It may be noted that students who, in question 42, said they were unaware of SIGI's existence went ahead anyway and answered questions 43-45. Such are the vagaries of questionnaires. We assume that the 75% who responded yes to question 45 were students who felt a need for career guidance.

Table D4A lists the responses of the control group to the open-ended questions.

Insert Tables D4 and D4A about here

The remaining 46 questions in the questionnaire for the experimental group sought to find out how these SIGI users rated their experience with SIGI (Table D5).

When asked to give SIGI a grade (questions 42-54), more than 75% of the students graded SIGI A or B for 8 of the 13 items (interest, clarity, overall usefulness, helping with values awareness, seeing relationships between values and career decisions, finding occupations to fit values, getting information, and learning to make career decisions). For the other five questions, which concern choice of an occupation, understanding predictions, estimating probabilities of success, getting information about programs of study, and helping to plan a program of study at Delta, the proportion of A's and B's was over 50%.

Insert Table D5 about here

As for their experience with SIGI (question 55), 51% said that SIGI helped confirm a choice they had already made, 9% said that SIGI helped them to choose an occupation, and 35% thought that SIGI had suggested other occupations worth considering. Only 5% failed to perceive SIGI as having been directly helpful.

Questions 56-63 asked the experimental students whether they would consult SIGI, a counselor, or a combination of the two for help with occupational and educational decisions. The students would tend to choose the combination for most guidance purposes. This preference held true for planning a program of study, getting information about an occupation, confirming an occupational choice, resolving conflicts about occupational choice, and estimating chances of success in a program. SIGI alone was preferred for finding occupations that fit values and for making values more clear. SIGI plus counselor or a counselor alone was thought to be more help in finding out about financial aid.

Almost half (48%) of the students who had used SIGI planned to schedule a conference with a counselor for a variety of purposes (questions 64 and 65). Other purposes were mentioned by five students (see Table D6, question 65).

Most of the students (75%) said that the occupations in which they were interested were actually retrieved on the basis of their values in Locate (question 66). Although they named a few occupations as "missing" from SIGI (Table D6, question 67), the "occupations" they named were often not occupations at all, but general fields of interest; some were already in SIGI and some were occupations with only small numbers of workers. A few students mentioned occupations that are scheduled to be added to SIGI in the next round of additions, such as buyer and park ranger. About 73% regarded the information in SIGI as superior to other sources of occupational information (question 68), and none found it worse.

Insert Table D6 about here

Of the Delta students who had used SIGI, 93% were satisfied with the 28 questions made available in Compare (question 69). There were five suggested additions; four of these concerned immediate job search, and the fifth--why occupations "do not show in your values"--was already in the Locate system. The questions suggested for addition are recorded in Table D6, question 69.

About 92% of the students found SIGI's style and vocabulary to be "just right," and only 4% said that it was too difficult (question 70). Since the reading level of the text was designed for community college students, this finding is particularly encouraging.

Few students detected any sexual or racial bias in SIGI (question 71). The lone example given by a student who did feel there was bias appears in Table D6; it reveals an interesting reversal of most definitions of bias.

Ninety-one responses were made to question 72, asking about problems that might have occurred in using a computer-based system. Twenty percent reported that the computer broke down during use; 14% thought that there was too much reading; 12% did not understand some of the directions; and another 12% wanted to sign off, but couldn't. Only 5% noticed any eyestrain. A number of other irritations were mentioned by the 10% of the students who checked "Other," such as being forced to wait for compulsory printouts, or being unable to go back as desired (Table D6, question 72).

About three-fourths (76%) of the SIGI users frequently took advantage of the opportunity to get printouts (question 73). Over half (58%) tried to get more information on their own initiative after using SIGI (questions 74 and 75). Almost half (49%) of the students spent between two and four hours on SIGI, and another 49% spent over four hours (question 76). Nearly all those in the sample (98%) went all the way through SIGI, including Strategy, at least once, usually in three or more sessions (questions 77 and 78). Seventy-one percent expressed an interest in securing additional time on SIGI (questions 79 and 80).

The six subsystems of SIGI seemed to meet a variety of different needs; every section would be "used most" by at least some students, although Compare and Planning received the largest percentages of votes (24% and 22%, respectively). Strategy and Prediction were the systems named least often (question 81).

Students found SIGI to be comprehensive: 91% said that there was nothing more they would like it to cover (question 82). A few wrote in suggestions for improvement, such as more predictions, more information about jobs, and so on (Table D6, question 82). Over two-thirds (70%) said that there was no area that needed fuller coverage (question 83), but others asked for more on Prediction, Values, Planning, Locate, more on transfer schools, salaries, job openings, and so on (Table D6, question 83). All areas were liked best by some students, but finding occupations that fit values and getting occupational information were the most popular, designated best by 28% and 26% of the group respectively (question 84). The privacy that SIGI makes possible was considered very important to 28% of the group, but it made no difference to another 20% (question 85). About 73% of the group said that they had advised their college classmates to use SIGI; of these, over half (62%) had recommended it to three or more friends (questions 86 and 87).

Question 88 asked the students for suggestions for improving SIGI. The answers are listed in Table D7. Most of the suggestions were for expansion of the information or services offered by SIGI or for minor changes to enable students to move more quickly to the sections in which they were most interested. There were a few suggestions that revealed insufficient information on the part of the student. The general tone, however, was one of approval, respect, and gratitude.

Insert Table D7 about here

Impact on Counseling

Responses of the 11 Delta College counselors and 3 counselor aides who filled out questionnaires are tabulated in Table D8. (The constructed responses to the open-ended questions on that instrument are in Table D9.) The counselor aides answer students' questions about SIGI and career information, and the aides are consequently treated as counselors as far as the questionnaire is concerned. Two of the 14 had never attended a SIGI workshop. It is possible that some of the responses would have been different if all the counselors had been exposed to a workshop.

With or without a workshop, however, the counselors were in general favorably disposed toward the idea of computer-based guidance (questions 4-8). None saw computer-based guidance as a potential threat (question 6), 12 planned to use such a system in their counseling (question 7), and 13 had actually referred students to SIGI (question 12). Counselors who had used SIGI and had observed SIGI students thought that those students reacted favorably to SIGI (question 13) and benefited in a number of ways (question 28). They thought that the reading level of SIGI was appropriate for their students (question 32), that the occupational information was generally better than other sources available (question 33), and that SIGI was for the most part free from any kind of bias (question 34). Only six counselors said that students came to them with printouts (question 14). Interpretation of the students' printouts was seen as a slight problem by two counselors, however. Five counselors said that students had encountered problems with the terminals (question 15): There had been some hardware malfunctions, and some students had needed assistance in matters unrelated to operation of the terminals; in the opinion of one counselor, assigning a paraprofessional to help students had overcome some problems (Table D9).

Questions 16-23 were designed to explore the effect SIGI might have on problems that counselors face in career guidance. The chief problems were keeping up to date with occupational information, getting students to read occupational information, and finding time to see all students who needed help; but all the problems in the list were major to at least two counselors. The most frequently specified minor problems were finding time, getting students to read occupational information, identifying students who need help, and selecting appropriate programs for students' goals; but all problems were minor for at least six counselors. Each problem was designated by one or another of the eleven counselors as having felt the impact of SIGI. SIGI was most frequently seen to have had an effect on getting students to read occupational information and on selecting programs appropriate for students' goals.

Insert Table D8 about here

Thirteen counselors responded to questions 24-27, which explore the impact that SIGI may have exerted on counseling sessions, but not all of them were in a position to observe the matter. Of counselors who had had opportunity to observe, one thought that SIGI enabled him or her to see more students, whereas seven noticed no change. Only one thought that SIGI had increased the amount of time spent in career counseling, or had increased the length of counseling sessions; five counselors had noticed no change in these areas, and none had seen a decrease. Four counselors thought that the quality of group discussion had been improved, whereas two noticed no change; none thought that quality had deteriorated.

Question 28 sought to discover how SIGI had affected students' career decision-making behaviors that might be observed in counseling sessions. Five counselors indicated they were in a position to know. For all seven questions, the majority of counselors answered yes, that SIGI students rated higher than non-SIGI students. The proportion of yes-to-no responses ranged from a high of 5 to 0 (question 3) to a low of 3 to 2 (questions 1 and 2).

Question 29 explored the subject of how SIGI should be fitted into the structure of the counseling department. Eight counselors accepted the idea of making SIGI available to students on an entirely ad lib basis with no counselor intervention or mandatory follow-up. All the other responses favored a structure in which the counselor would play a direct role in the career guidance process. Using SIGI as a component of formal career guidance instruction was the structure named most frequently--11 times. One counselor suggested a flexible configuration in which use of SIGI would depend on a student's degree of sophistication and readiness (see Table D9).

Counselors named some 17 occupations or occupational areas that they or their students would have liked to see in SIGI (questions 30 and 31). (Some of these were already in SIGI under different names.) All the respondents agreed that SIGI's writing style and vocabulary are appropriate for their students (question 32), and most of them compared the occupational information favorably with other sources (question 33). Only one thought there was bias, saying the pronoun "he" was used (question 34). Four counselors suggested improvements for SIGI (question 35), and five volunteered "Optional Information." These and the other written responses are listed in Table D9.

Insert Table D9 about here

Usage of the System

The computer automatically records the responses that students make to most displays. Tables D10-D23 represent these summary data on students who used SIGI at Delta College from September 1976 through January 1977. The n's are small--about one-half the size of samples at other schools--because Delta had been using SIGI for such a short time, and they vary from table to table, with higher frequencies in Values, Locate, and Compare, which novices encounter first, and somewhat lower frequencies in Prediction and Strategy, which novices encounter last. The reader should bear in mind that the summary data do not indicate the progress through SIGI of a particular group of students. They are merely a record of responses over a period of time. Consequently, the tables are to some extent independent of one another. Nevertheless, the n's are sufficiently large to be useful.

Data From the SIGI Introductory Sequence

Breakdown of the sample. Table D10 shows the breakdown of this sample by age, sex, and enrollment status. Percentages are given rather than actual numbers because students are asked about their age and enrollment status every time they sign on, since these variables may have changed between sessions.

We see that over half (57.3%) of "sign ons" were what might be called "older students," a finding that one might expect at a community college. The sample contained more women than men, but the disproportion should not affect any of the data that follow, since SIGI is not programmed to differentiate between users by sex. Only about 12% of the sample had had no college experience.

Insert Table D10 about here

Initial status with respect to career decisions. On their first pass through the introductory sequence, students respond to questions about their awareness of their occupational values, about their identification of occupations that fit their values, about their ability to predict their grades, and about their knowledge of appropriate programs to enroll in. Table D11 gives the distribution of their responses to these questions. The table reflects the state of mind of students as they begin their interactions with SIGI. We may make the following observations:

Insert Table D11 about here

1. About 15% of the students in the sample said they knew their values, and about 64% of them had a general idea of what they want from an occupation but had not analyzed their values ("Value Status").

2. They tended to feel a need for much information about which occupations fit their values.

3. They believed that they could predict their grades successfully in at least some programs.

4. Over a third (37%) of them had little or no idea what program to enroll in and would like help in planning.

Data from the Values System

The Values system yields measures showing the importance that students attach to each of the ten occupational values used in SIGI and also indicates the field of interest they would like to work in.

Values weights. Table D12 shows the means and standard deviations of the weights that students assigned to the values on a scale where 0 designates no importance and 8 maximum importance. The figures in the "Unrestricted" column are the weights assigned by students before they played the Values Game--i.e., the numbers represent the students' initial reactions to the definitions of the values. The "Restricted" column reflects the effects of both the Values Game and the constraint that the sum of the weights equal 40. The latter condition, of course, largely accounts for the smaller means in the Restricted column. It is not possible to separate the effects of the Values Game and the restriction to 40 points on all changes from the Unrestricted to the Restricted columns. In general, however, it would not be unreasonable to attribute changes in rank order (Income, Interest Field, Security, Leadership, Leisure, and Prestige) primarily to the Values Games.

Insert Table D12 about here

Table D12 shows (a) that each of the values was important to some students; (b) that there was no serious ceiling or floor effect, since even the highest and lowest weighted values exhibited sizable variation; (c) that, in general, Income, Interest Field, and Security were the three most important values for this group, whereas Early Entry was the least important; and (d) that in reaching the 40-point limit, students selectively reduced the weights orginally assigned--that is, not all weights were decreased proportionately. Students were least willing to give up Income and Interest Field and were most willing to reduce weights for Prestige, Leadership, and Early Entry.

The low weight given to Early Entry is not surprising, since all the students had already made some commitment to education beyond high school.

It is also interesting to note that the standard deviations show very little reduction. Indeed, one case (Income) shows a slight increase. Thus, the restricted case does not appreciably reduce the variance of the weights.

Selection of interest field. Before weighting the value Interest Field, students indicate which one of the six fields interests them most. They are given the opportunity to change fields before they adjust their weights to sum to 40 and whenever they elect to return to the Values system to review the weights originally assigned.

Table D13 shows the number of times each field was selected. Note that "N = 493" in this table means that 493 interest field selections were made by the sample of students. Some may have chosen the same field more than once, and others may have changed fields.

Insert Table D13 about here

Table D13 shows that the Personal Contact interest field was clearly the most popular, with Administrative and Scientific in second and third place. The Technological, Verbal, and Aesthetic fields were least popular.

Data from the Locate System

In Locate, students select a set of five values as a screen for retrieving potentially attractive occupations. The students specify a minimum return they would like on each value, and the computer then lists occupations that meet or exceed that minimum for each of the five values. Although students may choose any five of the ten SIGI values, the students are encouraged to choose their top-weighted ones.

Values selected for the screen. Table D14 shows the frequency with which each of the 10 values was selected as a member of the retrieval set. It may be inferred that students tend to use their most cherished values in

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Insert Table D14 about here

Locate, for, with the exception of Early Entry, there is close agreement between the rank order of the value weights (Table D12) and the rank order of the frequencies in Table D14. The frequency with which Early Entry is used in Locate may be due to the fact that Delta students are given orientation to SIGI before they start their interaction. They are told that they may use Early Entry in order to control the educational level of the occupations they get in Locate, and they are apparently doing so. Also, Delta has a higher proportion of older students than other field trial sites. As a group, they may tend to be more interested in early entry than are other students.

Specification levels or categories. For each value except High Income and Interest Field the student may specify one of four possible levels; there are five levels for Income, and there are six categories (not levels) for Interest Field. Table D15 shows the frequency with which the various levels or categories were specified. Again, the *n*'s and the numbers listed in the "FREQ" column indicate the number of times a value or specification was used, not the number of students making the specifications. Also, the numbers are associated only with values/specifications that actually retrieved acceptable lists of occupations. If a student's specifications are too strict or too loose, resulting in empty lists or ones of unwieldy size, he must alter the specifications, one at a time but in any order, until he finally arrives at a set that does retrieve.

Table D15 indicates that all the degrees of specification are used.

Insert Table D15 about here

The fact that the retrieval of an empty list forces the student to lower a specification (or change interest fields) may account for the frequency with which the lowest specification appears. (A value set at the lowest level does not screen, since all occupations meet or exceed that specification.) Table D15 also shows that students tend to specify mostly average and above average levels, and that when they use Interest Field as one of their search values, the most popular field (Personal Contact) was the one most frequently chosen in the Values system.

Occupations retrieved in Locate. What occupations do these values/specifications retrieve? Table D16 lists all the occupations in SIGI at the time of the data collection and the frequency with which each was retrieved. The frequencies include the interaction of initiates (students who have gone through the six subsystems in the prescribed order and who are consequently privileged to return to any subsystem) as well as novices.

In all, 154 occupations of the 155 in SIGI were retrieved for a total of 9,662 times. Only one occupation, Commercial Artist, was not retrieved.

At Delta, Early Entry ranked seventh among the values used in the retrieval process, whereas it ranked last at four out of five of the other colleges and eighth at the remaining college. The result is that two of the 12 occupations retrieved 132 times or more (novice and initiate) required less than a bachelor's degree, whereas at the other colleges all the occupations most frequently retrieved required a bachelor's degree or more.

Insert Table D16 about here

No occupation appeared more frequently than about 2.9% of the total frequency for novices and initiates. If we pool the teaching occupations, the 12 most frequently retrieved occupations would be

- Teacher
- Dentist
- Civil Engineer
- Optometrist
- Physician
- Lawyer
- Industrial Engineer
- Psychologist
- Speech Pathologist/Audiologist
- Legal Assistant
- Plumber
- Soil Conservationist

Data from the Compare System

Occupations selected for examination. Table D17 shows the frequency with which students (initiates and novices) selected occupations for examination in the Compare system. Students may select any occupations they want, but they are particularly encouraged to investigate occupations retrieved in Locate because those occupations tend to satisfy their values.

There were five occupations (Appliance Repair Technician, Business Machine Repair Technician, Dancer/Dancing Teacher, Diesel Mechanic, and Foreign Language Teacher) that students never selected. The one occupation which was not retrieved at all in Locate, Commercial Artist, was selected 10 times in Compare. On the other hand, the secondary school teaching occupations, which were among the most frequently retrieved in Locate, were asked about in Compare with relatively low frequency. It seems possible that many students tended to avoid the teaching occupations because they knew the job market has turned sour. In general, however, the two sets of frequencies are not inconsistent. The occupation most frequently asked about (2.5% of the total frequency) was Psychologist. Of the 12 most frequently retrieved in Locate, only Dentist, Physician, and Plumber are not among the "over 1%" list for Compare.

Insert Table D17 about here

In comparing absolute frequencies of occupations retrieved in Locate with those used in Compare, one must allow for the fact that a given occupation may be retrieved several times by one student through various lists of specifications in Locate, but will probably be selected only once by that student for examination in Compare.

Questions for which answers were sought. Students may ask up to 28 questions about the occupations they have selected. (For a list of the questions, see Figure 2, Chapter II.) Table D18 shows the frequency with which each of the questions was asked. All the questions were asked with considerable frequency, the highest being 7.58% of the total. The least favored were "Opportunities for leadership?" and "Prestige Level?" The five most often chosen were, in order,

Insert Table D18 about here

Description of work activities?
Definition of occupation?
Beginning salary?
Education required-- Early Entry?
Related college courses?

Data from the Prediction System

Reports of previous academic performance. Table D19 summarizes students' responses to questions about their previous academic performance. The responses are stored by the computer and may (or may not) be included among the predictor variables in any of the regression equations that compute the probability of a student's receiving various grades in a particular "key course." On the basis of 43 responses, Table D19 shows that almost two-thirds of the students reported that they had ranked in the second or third fifth of their high school class; 20% said they had ranked in the top fifth. Their mathematics grades had been mostly B's and C's. They presented a somewhat

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Insert Table D19 about here

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rosier picture with respect to their English grades; two-fifths of the students reported that they had earned A's, and almost 75% of them said they had got B or better. Over half (56%) of them were confident that they needed no help with English, and less than one-quarter of them believed positively that they *did* need help.

Programs for which predictions were requested. The list of programs for which the student can obtain predictions is different at each college. At the time of the evaluation, predictions were available in 15 programs at Delta. Table D20 lists these programs and shows the frequency with which each was selected in the Prediction system. Students sought predictions in all the programs. The programs most frequently selected were Social Work/Sociology, Data Processing, and Secondary Education.

Insert Table D20 about here

Selection of questions about probability. Also available in the Prediction system are explanations of probability and prediction. The explanations are in the form of answers to five questions that the student (novice or initiate) may ask if he chooses. (See Figure 5, Chapter II for the wording of the questions.) The questions were included in SIGI because we knew from our past experience that the concept of probability is difficult for many students. The frequency with which each question was selected appears in Table D21. Each question was important to some students. One-hundred forty-six students (assuming that each student asked only one question) sought answers to one or another question. This is over two-thirds (68%) of the students using the Prediction system, if we assume that the number of students is the same as or close to the number that reported their previous academic performance in Table D19--in the case of Delta, 215.

Insert Table D21 about here

Data from the Strategy System

(No summary data are collected from the Planning system. Indeed, the only information from that system that is worth recording as summary data would be the names and frequencies of the occupations selected for planning.)

In Strategy, the student selects a set of three occupations and indicates which one he favors most. Then he sees the Desirability Sums of the occupations. (See Chapter II, pages 32-34 for a description of Desirability Sums.) Next, he interacts with a discussion of a decision-making strategy based on assessment of rewards and risks, after which he estimates the probabilities of his successfully completing all the requirements for entry into each of the occupations. Finally, he once again indicates which of the occupations he favors most in light of the information he has accumulated about rewards (Desirability Sums) and risks (probability of entry).

Table D22 shows, in the first two columns, the frequency with which occupations were designated first choice when the set of three occupations was selected, and, in the third and fourth columns, the frequency with which they were designated first choice after assessment of rewards and risks.

Insert Table D22 about here

We must be cautious in interpreting Table D22, since it shows frequencies of choice, not changes. We cannot infer, for instance, that no students changed their minds about an occupation that has the same "post" frequency as "pre" frequency. We may note, however, that the most popular occupations, in terms of post frequency, were Legal Assistant, Retail Store Manager, Operating Room Technician, Computer Operator, and Computer Programmer, but the _n_'s are too small to warrant any inferences.

Choice in relation to desirability outcomes. What influences students' choice of occupation in this context? Table D23 provides some insights. Under the heading "Desirability Outcome" are the frequencies with which students, in their pre choice, selected the occupation that later turned out to have the highest Desirability Sum, to come within 10 points of the highest sum[1], or to fall more than 10 points below the highest. Apparently, two-fifths of the time (42%) students did not designate as their first choice the occupation that, as they soon learned, was the most likely to satisfy their values.

Insert Table D23 about here

The next set of figures, under the heading "Which Strategy," assesses the post choice of occupation with respect to the measures of reward and risk. The reader should understand that the options listed in the table do not all exist at the same time. For example, if the student had estimated that his chances were equal for successfully entering each of the three occupations, he would have only the last two options on the list:

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[1] Students are told to ignore differences of 10 points or less between Desirability Sums. For a discussion of how the 10-point "error" term was estimated, see Counselor's Handbook for SIGI (which is Appendix G of this report, pp. IX-12--IX-14.

He could choose either the occupation with the greatest Desirability Sum or one with a smaller sum. If he had made differential estimates of success, some of the first four options would be present, but not the last two; moreover, it might be that none of the three occupations had the fortunate combination of greatest Desirability Sum and greatest chances, and therefore the student would not have the first option. The reader should also remember that Sum high means having the highest Desirability Sum or coming within 10 points of the highest.

Nevertheless, we can make some inferences. The first four categories under "Which Strategy" represent instances of differences in both sums and chances. If we make the reasonable assumption that students would nearly always choose "Sum high, chances high" when that option was present, we have left 100 instances (48+41+11) where students had to choose on the basis of highest sum, or best chances, or some combination in which neither factor was best. In 48 instances (48% of the time), they selected the occupation with the highest sum; in 41 instances (41% of the time), they selected the occupation with the best chances; and in 11 instances (11% of the time), they selected an occupation that had neither the highest sum nor greatest chances. (This last is not necessarily an illogical choice, since it may be the best combination of reward and risk. See Counselor's Handbook for SIGI, which is Appendix C of this report, pages IX-25--IX-26.) There were 17 occasions when students estimated their chances as equal for all three occupations. In this situation, they made the apparently logical choice (occupation with the highest sum) 15 times and the apparently illogical one two times. We must be careful, however, not to infer that those two choices came from students who did not know what they were doing. We have learned from our interviews that behavior that appears inexplicable in printouts often has some logical explanation--even if it is only that the student was late for class and pushed the last few buttons at random to reach "Sign off" as quickly as possible.

Table D1: Responses by Experimentals and Controls to Questions 1-41 of SIGI Evaluation Questionnaires

(Unless otherwise noted, all figures except n's are percent.)

PERSONAL INFORMATION

1. Age: $n_E = 56$ $n_C = 119$

C	E	
70	68	(1) 15-22
17	16	(2) 23-30
13	14	(3) Over 30
0	2	(4) Rather not say

2. Sex: $n_E = 56$ $n_C = 119$

C	E	
44	30	(1) Male
56	70	(2) Female

3. Year in college: $n_E = 56$ $n_C = 116$

C	E	
67	48	(1) 1st
22	36	(2) 2nd
6	14	(3) 3rd
4	0	(4) 4th
1	2	(5) Graduate student

CAREER DECISION-MAKING

4. How well do you know what rewards and satisfactions you want from an occupation? $n_E = 55$ $n_C = 118$

C	E	
24	31	(1) I know exactly what I want from an occupation.
64	67	(2) I have a general idea of what I want from an occupation.
11	2	(3) I'm not sure what I want from an occupation.
1	0	(4) I have no idea what I want from an occupation.

**5. How many occupations have you explored as possibilities for yourself? $n_E = 56$ $n_C = 118$

C	E	
3	0	(1) None
51	14	(2) 1-2
33	50	(3) 3-4
13	36	(4) More than four

6. How many of the occupations that you know about are likely to give you the satisfactions you want? $n_E = 56$ $n_C = 119$

C	E	
8	4	(1) None
74	70	(2) 1-2
13	21	(3) 3-4
5	5	(4) More than 4

7. Which of the statements below best describes how definite your career plans are? $n_E = 56$ $n_C = 119$

C	E	
46	43	(1) I know exactly the occupation I want to enter.
29	35	(2) I am trying to decide between two different occupations.
18	11	(3) I am considering three or more different occupations.
7	11	(4) I do not have any specific occupation in mind at this time.

8. How well do you think you can predict your grades in various programs at your college? $n_E = 56$ $n_C = 119$

C	E	
28	32	(1) I think I could predict my grades accurately in any program of study I might take.
42	46	(2) I think I could predict my grades accurately in one or two programs, but not in all
18	18	(3) I have only a general idea of my grades in one or two programs.
12	2	(4) I can't predict my grades well in any program.

**9. Which of the following best describes the present state of your plans? $n_E = 56$ $n_C = 119$

C	E	
32	61	(1) I know which program to enroll in, which courses to take, and most of the other steps necessary to reach my occupational goal.
58	28	(2) I have a general idea of which program would be best, but I am not sure what other steps are necessary to reach my occupational goal.
10	11	(3) I don't know which program to take. I need help in planning my education.

Table D1 (continued)

C	E	
		10. Overall, how confident do you feel about your career decision-making skills? $n_E = 55$ $n_C = 119$
36	42	(1) Very confident
54	47	(2) Somewhat confident
10	11	(3) Not confident

Items 11-18 are activities related to thinking about occupations. Put a check under the heading which shows how much time you have spent on each of the activities.

	Never	Rarely	Sometimes	Often
*11. Reading about occupations. $n_E = 55$ ($n_C = 119$)	2(3)	16(23)	47(56)	35(18)
12. Talking with friends about the kinds of occupations they are considering. $n_E = 55$ ($n_C = 119$)	2(1)	5(11)	49(46)	44(42)
13. Talking with people in the field about their occupations. $n_E = 55$ ($n_C = 118$)	9(6)	27(31)	40(31)	24(32)
**14. Using the college's career reference library. $n_E = 55$ ($n_C = 118$)	7(54)	47(25)	37(19)	9 (2)
15. Attending career planning workshops. $n_E = 55$ ($n_C = 119$)	55(70)	31(17)	7(11)	7(2)
16. Talking to a guidance counselor about careers. $n_E = 55$ ($n_C = 118$)	13(24)	24(27)	45(38)	18(11)
**17. Using career-related audiovisual materials. $n_E = 55$ ($n_C = 118$)	33(60)	29(22)	31(17)	7(1)
**18. Using a computer-based guidance system. $n_E = 55$ ($n_C = 119$)	4(92)	18(3)	44(4)	34(1)

For statements 19-24, put a check under the heading that best describes how you feel.

	Strongly Disagree	Disagree	Agree	Strongly Agree
19. I would follow the advice of a teacher, counselor, parent, or friend in planning my career. $n_E = 55$ ($n_C = 117$)	7(6)	24(20)	56(59)	13(15)
20. Which occupation I enter will be mostly a matter of chance. $n_E = 55$ ($n_C = 119$)	44(43)	44(45)	12(9)	0(3)
21. Everyone seems to tell me something different, so I don't know which career to choose. $n_E = 54$ ($n_C = 118$)	28(32)	50(47)	17(18)	5(3)
22. I will decide for myself which occupation to choose. $n_E = 55$ ($n_C = 117$)	0(1)	7(2)	33(41)	60(56)
23. In order to plan for a career, I would need to know how soon I would be getting married. $n_E = 53$ ($n_C = 117$)	38(38)	43(45)	11(12)	8(5)
24. There is plenty of time before I have to start thinking about choosing an occupation. $n_E = 53$ ($n_C = 117$)	55(43)	32(47)	11(9)	2(1)

Table D1 (continued)

25. Rate yourself on how good a career decision-maker you think you are.

	n	$\bar{X}$	S.D.
E	$n_E = 54$	7.04	1.92
C	$n_C = 118$	6.71	1.97

Look at the scale below. Think of a friend your age who, in your opinion, makes good career decisions. Consider that person at the top of the scale (10).

Think of a friend your age who is not a good career decision-maker. Consider that person at the bottom of the scale (0).

Now think about yourself as a career decision-maker. Where do you fit on this scale? Circle the appropriate number on the scale from 0 to 10.

	0	1	2	3	4	5	6	7	8	9	10
E	0	2	0	4	7	7	7	22	32	13	6
C	1	0	1	3	8	20	4	24	22	10	7

A poor career decision-maker (0) — A good career decision-maker (10)

For items 26- 29 mark an X on the part of the scale which best shows what is true of you.

26. How much do you know about occupations?

	n	$\bar{X}$	S.D.
E	$n_E = 55$	2.66	.92
C	$n_C = 119$	2.39	.94

	0		1		2		3		4
E	2	2	4	5	20	13	33	7	14
C	2	0	12	5	33	11	20	4	13

very little (0) — a great deal (4)

27. How often do you plan ahead?

	n	$\bar{X}$	S.D.
E	$n_E = 55$	2.92	.96
C	$n_C = 119$	2.91	.96

	0		1		2		3		4
E	2	2	4	0	18	7	31	11	25
C	1	0	8	2	16	4	35	5	28

rarely (0) — often (4)

28. How do you feel after making an important decision?

	n	$\bar{X}$	S.D.
E	$n_E = 55$	2.86	.82
C	$n_C = 118$	3.06	.74

	0		1		2		3		4
E	0	0	9	0	13	7	44	13	14
C	0	0	3	0	15	5	44	8	25

I usually don't think I've done the right thing. (0) — I am sure I did the right thing. (4)

29. How clear is your knowledge of goals and values?

	n	$\bar{X}$	S.D.
E	$n_E = 55$	3.05	.87
C	$n_C = 119$	3.03	.92

	0		1		2		3		4
E	2	2	4	0	7	0	49	14	22
C	1	0	5	2	17	2	34	7	32

not clear (0) — very clear (4)

OCCUPATIONAL INFORMATION

30. What occupation would you most like to prepare yourself for eventually? Even if you are undecided, pick an occupation that appeals to you.

Name of occupation: Items 31+32+33+34, Information Test

	n	$\bar{X}$	S.D.
E	$n_E = 41$	6.32	.99
C	$n_C = 94$	6.24	1.07

Table D1 (continued)

% RIGHT % WR.

Answer questions 31-34 in relation to the occupation named in Item 30.

E 83 17
C 84 16

31. To enter this occupation, how much education beyond high school would you need?

___ (1) None.
___ (2) 2 years.
___ (3) 4 years (bachelor's degree).
___ (4) 5-6 years (master's degree).
___ (5) 7 or more (doctorate or law degree).
___ (6) Other (please explain: ______________________________)
___ (7) I don't know.

E 39 61
C 40 60

32. Check the salary range that indicates the average amount of money per year earned by people in this occupation.

___ (1) $20,000 or more
___ (2) $15,000-$19,999
___ (3) $11,000-$14,999
___ (4) $8,000-$10,999
___ (5) $7,999 or less
___ (6) I don't know.

E 37 63
C 34 66

33. Check the one statement which best describes the amount of supervision usually received by workers in this occupation.

___ (1) Work without supervision; plan own work; seldom evaluated by others.
___ (2) Supervised weekly; follow overall assignments.
___ (3) Supervised daily; work under supervisor who assigns and schedules work; free to decide details of work.
___ (4) Supervised hourly; activities are directly supervised with little opportunity to act on your own.
___ (5) I don't know.

E 73 27
C 65 35

34. Check the one statement which best describes the future employment prospects for workers in this occupation.

___ (1) Excellent: Strong demand for workers; shortage of qualified people.
___ (2) Good: Steady demand for workers.
___ (3) Fair: Demand limited except in certain geographic areas OR demand is decreasing due to automation or economic conditions.
___ (4) Poor: Little demand, if any; the occupation is very overcrowded, and few jobs are available.
___ (5) I don't know.

35. What college program (major) are you presently enrolled in? ______________

36. What occupation are you preparing for in this program or major? ______________

CAREER GUIDANCE

$n_E = 54$ 76 24

**37. Have you seen a counselor during the last two months? $n_C = 117$ 51 (1) Yes 49 (2) No

38. If yes, what thing(s) did you discuss? $n_E = 129$ $n_C = 211$

C	E	
5	9	(1) Your values
16	16	(2) Occupational choice
14	16	(3) Occupational information
19	12	(4) Curriculum choice
19	17	(5) Course selection
8	5	(6) Chances for success
4	3	(7) Program approval
3	4	(8) Family pressures
10	9	(9) Financial aid
2	7	(10) Other (please explain: ______________________________)

Table D1 (continued)

** 39. Have you taken or are you presently enrolled in a career guidance course at your college?

	(1) Yes	(2) No
$n_E = 54$	39	61
$n_C = 116$	11	89

40. If yes, how would you rate it? $n_E = 19$ $n_C = 10$

C	E	
20	47	(1) Excellent
70	53	(2) Adequate
10	0	(3) Poor

** 41. How do you feel about interacting with a computer for career guidance? $n_E = 55$ $n_C = 117$

C	E	
50	82	(1) Favorable
44	14	(2) Neutral
6	4	(3) Unfavorable

* $p < .05$

** $p < .01$

Table D2

Occupations Named by Experimentals in Response to Question #30

In SIGI[a]	Not in SIGI	Too Vague to Classify
(41 occupations)	(8 occupations)	(7 responses)
Accountant (2)[b]	Business administrator	Counselor
Accounting Clerk	Fashion merch. (Buyer)	Data processing
Architect	Medical assistant (2)	Early childhood development
Bank Officer	Merchant marine officer	Law Enforcement
Civil Engineer	Pro. baseball umpire	Medical/office field
Computer Programmer (2)	Residential construction	Teaching crafts
Dental Assistant	Teaching nursing	Social health assistance
Electronics Technician (3)		
Flight Attendant		
Funeral Director		
Interior Decorator		
Lawyer		
Legal Assistant (2)		
Medical Technologist		
Model		
Oceanographer		
Operating Room Technician (3)		
Personnel Interviewer		
Physician's Assistant		
Production Manager		
Psychologist		
Public Relations Worker		
Receptionist		
Respiratory Therapist		
Retail Store Manager		
Secretary (2)		
Social Service Aide		
Social Worker		
Speech Pathologist		
System Analyst		
Teacher, Early Childhood		
Teacher, Elementary School		
Zoologist		

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[a] If the occupational title used by the student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Social Worker Aide"is listed as "Social Service Aide," "Stewardess" as "Flight Attendant," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table D3

Occupations Named by Controls in Response to Question #30

In SIGI[a]

(94 occupations)

- Accountant (7)[b]
- Auto Mechanic
- Bookkeeper
- Botanist (2)
- Civil Engineer (4)
- Computer Operator
- Computer Programmer (2)
- Dental Assistant (2)
- Dentist
- Drafter
- Electronics Technician
- Engineering Technician (2)
- Fine Artist
- Flight Attendant
- Forester
- Hotel/Motel Manager
- Interior Designer (3)
- Lawyer (3)
- Librarian
- Mechanical Engineer (3)
- Medical Technologist
- Musician (2)
- Nurse, Registered (6)
- Occupational Therapist
- Operating Room Technician
- Pharmacist
- Photographer (2)
- Physician (3)
- Police Officer (5)
- Psychologist
- Real Estate Agent
- Secretary (5)
- Social Worker (5)
- Surveyor
- Teacher, Art (2)
- Teacher, Business
- Teacher, Early Childhood (3)
- Teacher, Elementary (7)
- Teacher, Special Education
- Teacher, Voc/Tech
- Veterinarian
- X-Ray Technologist (3)
- Zoologist

Not in SIGI

(9 occupations)

- Business Administration
- Business Management
- Construction (Houses) (2)
- Electrician
- Fashion Display
- Industrial Supervision
- Physical Therapy Assistant (2)

Too Vague to Classify

(17 responses)

- Broadcasting (3)
- Childhood Development (2)
- Data Processing Applications-Education
- Fashions
- Health or my own business
- Legal Assistant & Acct.
- Management (2)
- Marketing
- Mechanics
- Medicine or Allied Health
- Mental Health, Counselor
- Skilled Trades (Industry)
- Theater

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[a] If the occupational title used by student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Policeman" is listed as "Police Officer," "Stewardess" as "Flight Attendant," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table D4

Responses to Questions 42-45 of SIGI Evaluation Questionnaire for Controls

(Unless otherwise noted, all figures except n's are percent.)

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42. Are you aware that there is a computerized guidance system (SIGI) on campus? n =118
60 (1) Yes 40 (2) No

43. If yes, what is your impression of SIGI? n = 73
56 (1) Favorable
23 (2) Neither favorable nor unfavorable
2 (3) Unfavorable
19 (4) No impression

44. How did you learn about SIGI? n =98
2 (1) Friends
68 (2) Counselor
4 (3) Posters, Brochures
5 (4) Newspaper
21 (5) Other (please explain: ______________________________)

45. Do you want to use SIGI? n = 108 75 (1) Yes 25 (2) No

If yes, when? ______________________________

If no, why not? ______________________________

PLEASE RETURN THIS QUESTIONNAIRE TO ETS IN THE ENVELOPE PROVIDED.

THANK YOU FOR YOUR COOPERATION.

Table D4A

Control Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #38 (Other Reasons for Seeing a Counselor)

My counselor and I found out more about each other.
Credit transfers. (Mentioned by 2 students.)

Question #44 (Other Ways of Learning About SIGI)

Orientation. (Mentioned by 2 students.)
This questionnaire from Delta. (Mentioned by 17 students.)
Teachers.
Researched it as part of class.

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[a] Some of the responses have been slightly edited.

Table D5

Responses to Questions 42-88 of SIGI Evaluation Questionnaire for Experimentals

(Unless otherwise noted, all numbers except n's are percent.)

EVALUATION OF SIGI

Circle the grade that you would give SIGI on each of the following:

42. How interesting was SIGI to you? n = 55	60 A,	27 B,	9 C,	4 D, or	0 F
43. How clear was SIGI in giving information? n = 55	51 A,	40 B,	7 C,	2 D, or	0 F
44. Overall, how good is SIGI? n = 55	A, 47	B, 42	C, 7	D, or 4	F 0

Circle the grade that shows how useful SIGI was in each of the following:

45. Helping you decide which occupation to prepare for. n = 54	18 A,	48 B,	26 C,	6 D, or	2 F
46. Helping you become more aware of your values. n = 54	57 A,	33 B,	6 C,	4 D, or	0 F
47. Showing you the relationship between values and career decisions. n = 55	53 A,	31 B,	14 C,	0 D, or	2 F
48. Helping you find out which occupations might fit your values. n = 55	53 A,	33 B,	7 C,	7 D, or	0 F
49. Helping you get information about occupations. n = 55	A, 60	B, 33	C, 5	D, or 2	F 0
50. Helping you understand grade predictions expressed in probabilities. n = 54	A, 20	B, 33	C, 37	D, or 4	F 6
51. Helping you estimate probabilities of success in one or more programs. n = 55	25 A,	33 B,	31 C,	11 D, or	0 F
52. Giving information about programs of study at your school. n = 54	33 A,	19 B,	26 C,	20 D, or	2 F
53. Helping you plan a program appropriate for an occupation you are considering. n = 54	26 A,	41 B,	22 C,	11 D, or	0 F
54. Helping you learn how to make career decisions. n = 53	A, 45	B, 32	C, 17	D, or 6	F 0

55. What role has SIGI played in your occupational choice? n = 57
9 (1) SIGI helped me to choose an occupation.
51 (2) SIGI helped confirm the choice I had already made.
35 (3) SIGI suggested other things which I am considering.
5 (4) SIGI provided little or no help.

Table D5 (continued)

To get help with occupational and educational decisions, you can go to SIGI and to a counselor. For each of the following, (56-63), put a check under the heading which, in your opinion, represents the best source of help.

	SIGI Alone	Counselor Alone	SIGI & Counselor
56. Plan program of study $n_E = 55$	9	16	75
57. Get information about occupations $n_E = 55$	40	4	56
58. Confirm an occupational choice $n_E = 53$	25	15	60
59. Find occupations that fit values $n_E = 56$	61	7	32
60. Find out about financial aid $n_E = 54$	7	45	48
61. Make values more clear $n_E = 53$	58	6	36
62. Resolve conflicts about occupational choice $n_E = 54$	24	20	56
63. Estimate chances of success in a program $n_E = 55$	31	11	58

64. Have you scheduled or do you plan to schedule an appointment with a counselor as a result of using SIGI? $n_E = 56$ 48 (1) Yes 52 (2) No

65. If yes, what was or will be the purpose of this visit? Check all the topics you discussed or plan to discuss. $n_E = 141$
11 (1) Your values
14 (2) Occupational choice
15 (3) Occupational information
13 (4) Curriculum choice
12 (5) Course selection
10 (6) Chances for success
4 (7) Program approval
4 (8) Family pressures
3 (9) Financial aid
12 (10) SIGI print-outs
2 (11) Other (please explain: ______)

66. In using SIGI, did the occupations of interest to you show up on the list determined by your values? $n_E = 55$ 75 (1) Yes 25 (2) No

67. Were there any occupations missing from SIGI that you were interested in? ____ (1) Yes ____ (2) No

If yes, name them: ______

68. Compared to other kinds of occupational information, how would you rate the occupational information presented in SIGI? $n_E = 55$
73 (1) Better
27 (2) About the same
0 (3) Worse

69. SIGI has 28 questions you can ask about occupations. Are there other questions about occupations that you wish had been in SIGI? $n_E = 55$ 7 (1) Yes 93 (2) No

If yes, what question(s) would you add to the SIGI list?

Table D5 (continued)

70. How would you rate SIGI's writing style and vocabulary? n = 55
4 (1) Too difficult
92 (2) Just right
4 (3) Too simple

71. Did you find sexual, racial, or other bias in SIGI? n = 55 4 (1) Yes 96 (2) No

If yes, give examples:

72. Below is a list of problems that may have occurred in using SIGI. Check any that you experienced: n = 91
12 (1) I did not understand some of the directions.
5 (2) The writing on the screen strained my eyes.
8 (3) I had to wait too long for an appointment to use SIGI.
14 (4) There was too much reading.
9 (5) I felt rushed while using SIGI.
20 (6) The computer broke down while I was using SIGI.
10 (7) The writing on the screen was jumbled.
12 (8) I wanted to sign off SIGI, but couldn't.
10 (9) Other (please explain: ______________________________)

73. How often did you request a print-out on SIGI? n = 55
76 (1) Frequently
24 (2) Sometimes
0 (3) Once or twice
0 (4) Never

74. After using the computer, did you do anything to get more information on your own?
n = 55 58 (1) Yes 42 (2) No

75. If yes, what did you do? n = 48
42 (1) Read
31 (2) Spoke to people in the occupation
12 (3) Used audiovisual material
15 (4) Other (please explain: ______________________________)

76. How much time did you spend on SIGI? n = 55
2 (1) 1-2 hours
49 (2) 2-4 hours
49 (3) 4-6 hours or more

77. Did you go all the way through SIGI (including the Strategy section)? n = 55
98 (1) Yes 2 (2) No

78. Over how many sessions did you use SIGI? n = 54
2 (1) One
17 (2) Two
81 (3) Three or more

79. Do you think you would profit from further use of SIGI? 71 (1) Yes 29 (2) No
n = 55

80. If yes, how many additional sessions would you like?
26 (1) One n = 39
31 (2) Two
43 (3) Three or more

Table D5 (continued)

81. Which sections would you use most? n = 119
19 (1) Values
19 (2) Locate
24 (3) Compare
9 (4) Prediction
22 (5) Planning
7 (6) Strategy

82. Is there anything SIGI didn't cover that you would like it to cover? n = 55
9 (1) Yes 91 (2) No
If yes, please explain:

83. Is there any area you wish SIGI had covered more fully? n = 53 30 (1) Yes 70 (2) No
If yes, please explain:

84. What did you like best about SIGI? (check one only) n = 75
15 (1) Learning about my values
28 (2) Finding occupations that fit my values
26 (3) Getting occupational information
1 (4) Getting grade predictions
9 (5) Learning what courses to take to prepare for an occupation
4 (6) Learning a strategy for making decisions
13 (7) Learning how values affect decisions
4 (8) Other (please explain:)

85. What you did on SIGI was completely private. How important is this fact to you? n = 54

0		1		2		3		4
20	2	15	2	17	2	11	3	28
privacy made no difference								very important

86. Have you advised friends at your college to use SIGI? n = 55 73 (1) Yes 27 (2) No

87. If yes, how many? n = 40
38 (1) 1-2
37 (2) 3-5
25 (3) 6 or more

88. Is there anything else you would like to tell us that would help us improve SIGI?

Table D6

Experimental Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #65 (Purpose of Appointment with Counselor)

Demand for any occupation.
Career guidance course.
Transferring to another college.
Required for career planning.
How up-to-date SIGI is.

Question #67 (Occupations of Interest Missing from SIGI)[b]

Accounting-104; aide, social service; bookkeeping, building inspector, buyer, caseworker, computer operator.
Medical assistant or dental assistant.
Outward-bound instructor.
Medical technology, operating room technician.
Teaching nursing. (I had to use nurse, registered--and teacher, biology.)
Retail store manager.
Police, secret service.
Merchant marine officer--cartographer.
Building construction.
Operating room technician. (Mentioned by 2 students.)
Four-year electrical engineering technician
Just chemical engineer. SIGI had general engineer.
Attorney, park ranger, teacher.
Librarian.
Auditing and tax return services.
Computer operator.
Health teaching.
Wildlife biologist (though it was related to zoologist).
A career in marketing other than marketing researcher.
Fashion coordinator.
Broadcasting engineer.
Stewardess.
Drama teacher.
Purchasing--buyer--D.P. manager.
More occupations in the art field, and information about them.
Retailing.

Question #69 (Additional Questions Students Would Like to Ask)[b]

What related jobs within that particular job are available?
How many jobs open a year?
Locations of jobs.
Why certain occupations do not show in your values when you consider it just as good as the one shown.
What is job outlook in my own area (community)?

Table D6 (continued)

Question #71 (Examples of Bias in SIGI)

It suggested firefighter as an occupation, which I would have no interest in, as I feel it is more of a man's job.

Question #72 (Other Problems in Using SIGI)

Delta didn't have enough course analyses (school prediction).
Printouts were given even if I didn't want printouts. (Mentioned by 4 students.)
If you made some mistakes you could not adjust them.
SIGI broke down and they didn't call when I made an appointment.
Too many examples.
Couldn't go back until all areas were covered.
The data on mortician was outdated.
(a) When I wanted to go back into another part of SIGI, it wouldn't let me, (b) Made me get prints I didn't want, and (c) Only wanted to make 1 or 2 occupational choices, SIGI demanded 3.
Temporarily broken down--for a day.

Question #75 (Other Steps Taken to Get More Information After Using SIGI)

Sent for career information.
Saw my counselor. (Mentioned by 4 students.)
Wrote.
College relations person.

Question #82 (Additional Topics SIGI Could Have Covered)

Nuclear medical technology.
More educational courses on occupation besides just a two-year level.
The name and address of the places where I can go and apply for work.
An introductory pamphlet explaining all of the occupations presented.
Drama teacher, etc. More predictions in different curriculums.
Other schools in the nation besides Michigan.
SIGI needs more occupations which can be predicted.

Question #83 (Areas That Should Have Been Covered More Fully)[b]

The transfer schools.
Prediction. I could have used more help in understanding it.
Values. (Mentioned by 2 students.)
College courses examination (roughly).
Operating room technician.
Planning--didn't have enough occupations in it. (Mentioned by 2 students.)
Salaries, advancement and location of available jobs.
A better list of information on jobs.
More emphasis on values.
In prediction the purpose was unclear. I didn't agree that by a grade in one key course you could predict performance in others.
Locate.
The name of all the places where I could go and apply for a job in the field I am entering.

Table D6 (continued)

Question #83 (continued)

Prediction. (Mentioned by 2 students.)

An hour-introductory class explaining understanding the value system and perhaps the six sections.

It would help to be more specific about different kinds of jobs in one field, and just simply more information in and about each field.

The grade prediction was bad because it should have asked more information about the person than just the grade, but it is still great.

Locate. Had I had a little more time here I would have been more prepared for the sections after it.

The course selections for a particular curriculum.

Question #84 (Other Things Liked Best About SIGI)

Financial aid.

Spending my time working on the computer.

---

[a] Some of the responses have been edited slightly.

[b] In some cases students suggested occupations or innovations already in SIGI.

Table D7

Suggestions for Improvements in SIGI Given by Experimentals in Response to Question #88[a]

I feel this is a good tool in career planning for the young student who has not had a previous career to affect his/her values.

More information about fashion curriculum.

SIGI was very helpful and above all, interesting, which made it fun to use and it helped me see other occupations that I might be interested in. The people who instructed it were kind, courteous, and very helpful.

I wish you could sign off more quickly when you get the information you need.

When working with the system a chance to type in your feeling about situations.

I wasn't satisfied with predictions but when I think about it, the approach was probably the best if not the only. I thought SIGI was stimulating and told friends that it's enjoyable.

Less breakdown in terminals would help in getting appointment to use SIGI when desired.

I really liked it. There was more information than in any one book.

I enjoyed working with SIGI very much. Thank you for this opportunity.

Maybe it would be nice if we could have 1/2 hour sessions because I only have 2 hours free, and I like to get other things done beside one full hour with SIGI.

More correct data on occupations; example = conservationist.

No. SIGI was helpful to me in a few areas and I myself don't see any improvement really needed. As I answered in #72, there was a little too much reading. I think it could be written with fewer words and say the same.

Limit the amount of pre-determined printouts. The prediction system was not very good in respect to shooting an arrow, etc.

It helped me in several of my classes--the current information that is.

I thought it was dumb. I don't like computers and I never will.

Bring in values of exceptions about jobs and courses.

Planning and Strategy sections were boring.

Expand it to more places. Tell more people about it, because it is very helpful and was very valuable to me in finding values, making predictions, and getting info on many subjects.

Table D7 (continued)

I realize that not all occupations can be put into SIGI, but I feel the system only benefits students choosing a traditional or fairly popular occupation. Also I think only one interest field is impossible to choose. I was between two or more.

I believe each student should be advised to use SIGI when entering school--as I noticed it makes you think. A saturation program should be taken to bring attention to the program--as many people I have talked to do not know of SIGI's existence.

If you could get a few more terminals, get a couple of more questions in questions part.

It seemed to me there was too much cautionary about excessive reading, etc. It made me leery about trying it. The process was simple but effective. I think too much of an introduction led me to believe it was too complicated. Thank you for this assistance. I have enjoyed it and gained insight.

There were certain courses that SIGI suggested that had nothing to do with the occupation. I thought I was requesting info about a medical occupation, and it came up with a history major course. Numbers on the attached sheet of occupations sometimes got messed up. Also it would print when I pressed "next" when I didn't want it printed.

Not at the present time, thank you.

It would be more helpful to a high school senior. They have usually not made a concrete decision about career plans. At that age level I had already decided what my career would be. I'm only 16 credits from finishing.

Make it so SIGI can be used even when not in a SIGI account and on more types of terminals.

Don't make us take a printout on some of the things.

Once in awhile it repeats itself, also goes over the same thing a number of times. Otherwise, it's basically good.

Allow a person a longer time on SIGI at one time if they request it. I really felt rushed through it.

Make more time available to fit in with courses taken at Delta.

Please put more classes on the prediction portion.

It is a fine program.

Values. You just have a list of values and then tell me to make the sum of 40 and in my case I put early entry because I want a job, and I have been out of high school 14 years so I chose something that I like and would not take me long to get a job because I was married and now I am a divorcee and need a job now. I also have a son to take care of so therefore the values

Table D7 (continued)

I gave are due to the condition I am in now; see if I were younger I wouldn't have said early entry. I hope you understand this example. I have been going to school three years already. I am not taking a full load each semester so it is a slow process, so your values are different according to what stage you are in life.

SIGI was good enough to where I'm to the point where I think forestry is the occupation I would want, but I'm not sure just how good my chances are of getting a job in forestry once I get my degree.

Bigger choice of occupations--being able to choose just one if you want.

Publicize it more.

Make the program require less reading.

When a person is finished with SIGI an appointment with a counselor should be made or set already--and it would be better to meet in a group probably the one I started in.

I think this is the best thing that I could have done to help me make my decisions. More people should be informed of this program when enrolling in college--not after 3 semesters of not knowing what to do and not getting proper help from counselor.

SIGI was great and the work that was put into the program was well worth the effort. Thank you.

---

[a] Some of the responses have been edited slightly.

Table D8: SIGI EVALUATION QUESTIONNAIRE FOR COUNSELORS

BACKGROUND INFORMATION

1. What percent of your time do you spend in career counseling (as opposed to personal counseling, academic advisement, etc.)?
   - 0 (1) None
   - 4 (2) 25% or less
   - 8 (3) 25-50%
   - 1 (4) 50-75%
   - 1 (5) 75-100%

2. On the average, how many students do you see each week for career counseling?
   - 0 (1) None
   - 3 (2) 1-5
   - 6 (3) 5-10
   - 1 (4) 10-20
   - 4 (5) 20 or more

3. How long are most sessions for career counseling?
   - 4 (1) less that 30 minutes
   - 10 (2) 30 minutes to an hour
   - 0 (3) one to two hours

Please indicate whether you agree or disagree with each of the following statements about computer-based guidance systems.

	Agree	Disagree	Not sure
4. Computer-based guidance systems are a passing fad.	1	12	1
5. Computer-based guidance systems can relieve counselors of many routine duties, leaving more time for professional counseling activities.	10	3	1
6. Computer-based guidance systems are a potential threat to the jobs of counselors.	0	14	0
7. I will probably never make much use of computer-based guidance systems in my work with students.	1	12	1
8. Computer-based guidance systems are capable of helping students make rational career decisions.	13	0	1

EXPERIENCE WITH SIGI

9. Have you attended a SIGI Counselors' Workshop? 12 (1) Yes 2 (2) No

10. Have you had a chance to use SIGI yourself? 14 (1) Yes 0 (2) No

11. If so, which of the SIGI subsystems have you been through?

	Once	More than once
(1) VALUES	6	8
(2) LOCATE	6	8
(3) COMPARE	3	8
(4) PREDICTION	5	6
(5) PLANNING	8	5
(6) STRATEGY	7	6

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Table D8 (continued)

12. Have you referred students to SIGI? 13 (1) Yes 0 (2) No

If so, how many?________

For what reasons?________

13. How have most students at your college reacted to SIGI?
12 (1) Favorably
0 (2) Unfavorably
2 (3) No opportunity to observe

14. Have students come to you with their SIGI printouts? 6 (1) Yes 8 (2) No

What problems, if any, have you had in helping students interpret their printouts?________

15. Have students come to you with problems related to use of the SIGI terminals?
5 (1) Yes 9 (2) No

If so, what kinds of problems have they encountered?________

Prior to having SIGI at your college, to what degree was each of the following (Items 16-22) a problem to you in your role as a counselor?

	Major problem	Minor problem	No problem	Not relevant to me
16. Getting students to read occupational information.	4	7	1	2
17. Keeping up-to-date on occupational information.	5	6	2	1
18. Identifying sources of occupational information.	3	6	4	1
19. Finding time to see all the students who want the help of a counselor.	5	7	1	1
20. Identifying students who need help with their educational and occupational plans.	3	7	2	2
21. Selecting appropriate programs of study for students' career goals.	2	7	2	2
22. Other:________				

23. Has SIGI had an impact on any of the above problems? 11 (1) Yes 0 (2) No

If so, which ones? (Circle responses.)

(16)	(17)	(18)	(19)	(20)	(21)	(22)
9	5	4	4	5	6	1

Please explain:________

Table D8 (continued)

Have you noticed a change in any of the following (Items 24-27) now that SIGI is available to students at your college?

		Increase	Decrease	No change	No opportunity to observe
24.	Number of students you are able to see.	1	0	7	5
25.	Amount of time you spend doing career counseling.	1	0	5	7
26.	Length of career counseling sessions.	1	0	5	6
27.	Quality of group discussions about values and career decisions.	4	0	2	7

28. Do you know which of your students have used SIGI and which have not?
5 (1) Yes 8 (2) No

If so, in your opinion do students who have used SIGI rate higher than students who have not used it in their ability to:

	Yes	No	No opportunity to observe
(1) express clearly the satisfactions they want from an occupation?	3	2	1
(2) state their primary occupational choice?	3	2	1
(3) mention alternative possibilities?	3	0	1
(4) indicate sound reasons for their preference?	4	0	2
(5) show they are well-informed about their first-choice occupation?	4	0	1
(6) decide what programs of study are suitable for each occupation being considered?	3	1	2
(7) evaluate their chances of success in programs being considered?	4	0	2

29. How do you think students should gain access to SIGI? (Check one or more.)
8 (1) Terminals should be available to students on a first-come, first-served basis, and follow-up sessions with counselors should be optional.
3 (2) Students should be required during their first year of college to use SIGI and schedule a follow-up session with a counselor.
7 (3) Counselors should refer students to SIGI and require a follow-up session afterward.
11 (4) SIGI should be used as part of a career guidance unit in a classroom course.
3 (5) Other: ____________

SUGGESTIONS FOR IMPROVEMENT

30. What occupations do students frequently ask about that are missing from SIGI?

31. Are there other additional occupations that you would like to see included in SIGI?
5 (1) Yes 2 (2) No

If so, please list them: ____________

32. Are SIGI's writing style and vocabulary appropriate for your students?
13 (1) Yes 0 (2) No

If not, what changes would you suggest? ____________

Table D8 (continued)

33. How does the occupational information in SIGI compare to other sources available to students at your college?
__8__ (1) Better
__5__ (2) About the same
__0__ (3) Worse

34. Did you find any sexual, racial, or other bias in SIGI? __1__ (1) Yes __13__ (2) No

If so, give examples:

35. What suggestions do you have for improving SIGI, the Handbook for Counselors, or the Counselors' Workshops?

OPTIONAL INFORMATION

Members of the SIGI research staff are especially interested in hearing about any personal experiences which you or your colleagues may have had in working with SIGI. Please use the space below to record any observations, amusing anecdotes, students' comments, etc., which you would like to share with us.

---

[a] Includes responses by three counselor aides who answer students' questions about SIGI and career information.

Name: ______________________ College: ______________

PLEASE RETURN YOUR QUESTIONNAIRE IN THE ENVELOPE PROVIDED

THANK YOU FOR YOUR COOPERATION

Table D9

Counselors' Responses to Open-Ended Items on the Counselors' Questionnaire[a b]

Question 12 (Reasons for Referring Students to SIGI)

Career information and decision-making.

Mainly students who are concerned because they are uncertain about their vocational goals.

To compare related job functions and values.

Unsure of goal.

Career decision, checking out values, undecided students, information about other careers.

Clarification of fields of career interest; to learn decision-making techniques; to obtain career information.

Needed help with values as well as a need to compare occupations.

To open students to their values and how these values relate to the world of work.

Undecided.

To add to decision-making class.

Attempting to integrate SIGI into current career counseling techniques.

Career indecision.

Question 14 (Problems Associated with Printouts)

None.

Some difficulty with students reacting to only a part of a value definition; getting students to be aware of patterns as opposed to exact occupational answers.

Deciding "why" a certain occupation "fits" or "doesn't fit" a certain value.

No problems; just expanded what they saw and felt.

Question 15 (Problems Associated with the Terminals)

Some mechanical problems. Initial confusion on occupations feedback in Locate.

Wanted more assistance in selecting goal.

Getting on [SIGI]--stopping, etc. As of November 15, when our para-professional started to help, I had no complaints.

Hardware, locating specific jobs they have in mind through readjusting values.

Internal--breakdown or stoppage of service.

Question 22 (Other Problems Associated with Career Counseling)

No responses.

Question 23 (Impact of SIGI on Counseling Problems)

Students will let SIGI retrieve the information, but will not do so for themselves. [Referring to #21]--At least offers a choice based on a systematic process, which students feel comfortable with.

Table D9 (continued)

Question 23 (continued)

Too early to determine.

Students are in some cases more apt to drop by our career center and sit down with SIGI than make an appointment with a counselor.

More awareness.

Different situation--I came to Delta after SIGI did.

An available source of career information.

All the problems listed, #16-21.

SIGI has helped because of its location. #17 and #18 are being aided because students are using the career center where SIGI is "housed."

[Referring to #16]--makes information reading more interesting.

The complete terminal/student interaction definitely provides a better vehicle than just printed materials--it enhances activity instead of passiveness.

Question 29, Item 5 (Other Ways of Making SIGI Available to Students)

A good orientation program can also help overcome client misconceptions related to career choice and use of SIGI.

Should be flexible and based on student's readiness or level of sophistication.

Before using a SIGI terminal, students are required to attend a 1/2 hour SIGI information session.

Question 30 (Occupations Suggested by Students for Addition to SIGI)

Physical Therapy Assistant--basically SIGI seems to need a greater variety of allied health careers (below the Bachelor's level).

Fashion coordinator, medical para-medic.

Electrician, forestry aide, security (industrial & retail), technical illustrator, conservation officer, therapist, music.

Unable to comment--not enough experience.

None have come back as yet--too early.

No opportunity to observe (2 responses).

No feedback as yet.

None to date.

Question 31 (Occupations Suggested by Counselors for Addition to SIGI)

Always need more information.

Gerontology specialist.

Not presently.

Uncertain.

Have to study SIGI in more detail.

More technical and skilled trade occupations.

Animal husbandry (Vet. Assistant); E.M.T. (Emergency Medical Technician--not the same as Physician's Assistant); Dental Lab Technician; Health Optics (Optometric Technician); Physical Therapy Assistant.

Question 32 (Suggested Changes in Writing Style)

Haven't had any complaints. Only complaint is too much reading.

Too soon to evaluate.

Table D9 (continued)

Question 34 (Examples of Bias in SIGI)

There are places in text that make referral to "he." Have noted changes in references about sex in "prediction" and "strategy."

Question 35 (Suggestions for Improvement)

Not enough time or experience to really evaluate properly yet.

More terminals available. Have instructors go through the SIGI process, to encourage them to suggest [SIGI] to students.

I find myself still becoming educated to SIGI and its usefulness. Hopefully, by next year, I will be in a better position to comment here.

Workshop was excellent. Handbook is excellent.

Summarize all the basic information about SIGI in introduction so we can go to one place to refresh ourselves on the systems.

Make printouts optional each time--students don't always want printouts they're forced to receive.

In Compare subsystem: Occupation 128 (Dental Assistant), "Advancement?" should state also the possibility of expanded duties for the C.D.A. (Certified Dental Assistant) and with B.A. degree teaching. "Data/People/Things?" should have things at medium level. Occupations 128 [Dental Assistant], 130 [Dental Hygienist], and 219 [X-Ray Technologist], "Definition of occupation?" needs much improvement.

Optional Information

Very few students have not kept their appointment. I'm finding students making tentative choices based on information retrieved in Compare, so Judy is encouraging them to check values in Locate and return to Values for adjustments.

I am using SIGI with my Operating Room Tech (ORT) students. The idea is to have them come away with other occupations they may go into, if they find that ORT is not for them. Since ORT is not in the SIGI system, none of them were afraid of their values not matching up with their college curriculum choice. I'll have more to report when I see them on December 9th.

The few students I have discussed this with felt it confirmed career choices. A few others were surprised over the discrepancies in their values in work and their salary expectations.

Amusing anecdotes--one student kept pushing NEXT bar and saying, "How do you back this thing up?!!" Many times the students will push wrong button and want to change their answer. Some complain about eye strain and length of job game (Values) and Strategy section. Favorable comments far outweigh the unfavorable at the present time.

Students' comments have been extremely favorable--only negative comment which has been made by several appears to relate to the "Definition of occupation" question in the Compare section. They say the definition is too brief and really doesn't say much.

---

[a] Some of the responses have been edited slightly.

[b] Includes responses by three counselor aides who answer students questions about SIGI and career information.

Table D10

Breakdown of Sample by Age, Sex, and Enrollment Status

Factor	%
Age	
18 or under	12.24
19-21	23.03
22-24	7.47
25 or over	57.26
Sex	
Male	45.58
Female	54.42
Enrollment status	
About to enter	12.34
1st semester or quarter	23.72
Completed 1 or more semesters	51.49
Other	12.44

Table D11

Initial Status with Respect to Career Decisions

```
VALUE STATUS (N= 275 )                               FREQ              %
                                                     ----              -
   I KNOW WHAT I WANT.                                 41          14.91
   GENERAL IDEA OF WHAT I WANT.                       175          63.64
   WOULD KNOW IF I SAW IT.                             25           9.09
   I'M IN THE DARK.                                    34          12.36

OCCUPATION STATUS (N= 275 )                          FREQ              %
                                                     ----              -
   I CAN LIST 3 OCCUPATIONS.                           18           6.55
   1 OR 2 OCCUPATIONS THAT FIT.                        35          12.73
   NOT SURE THEY FIT MY VALUES.                        73          26.55
   I NEED LOTS OF INFORMATION.                        149          54.18

PREDICTION STATUS (N= 275 )                          FREQ              %
                                                     ----              -
   PREDICT GRADES IN ANY PROGRAM.                      66          24.00
   PREDICT GRADES IN SOME PROGRAMS.                   135          49.09
   GENERAL IDEA OF MY GRADES.                          55          20.00
   I CAN'T PREDICT MY GRADES.                          19           6.91

PLANNING STATUS (N= 275 )                            FREQ              %
                                                     ----              -
   KNOW WHICH PROGRAM TO ENROLL IN.                    60          21.82
   GENERAL IDEA WHICH IS BEST.                        112          40.73
   DON'T KNOW WHICH PROG. TO TAKE.                    103          37.45
```

Table D12

Means and Standard Deviations for the 10 SIGI Values

Value	Unrestricted[a]		Restricted[b]	
	$\overline{X}$	S.D.	$\overline{X}$	S.D.
Income	5.17	1.44	4.90	1.47
Prestige	4.01	1.73	3.21	1.46
Independence	4.69	1.78	4.34	1.42
Helping Others	4.53	2.03	4.08	1.99
Security	5.26	1.83	4.79	1.65
Variety	4.87	1.65	4.38	1.51
Leadership	3.91	1.67	3.34	1.49
Interest Field	5.01	1.83	4.80	1.72
Leisure	3.66	1.64	3.29	1.47
Early Entry	3.38	2.11	2.86	1.92

[a] Students weighted each value on a scale ranging from 0 (no importance) to 8 (maximum importance), with no restriction on the magnitude of the sum of weights.

[b] Students were forced to adjust their weights to sum to exactly 40 points.

Table D13

Frequency with Which Each of the Six Interest Fields Was Selected

Interest Field (N = 493 [a])	Freq [a]	%
Scientific	94	19.07
Technological	44	8.92
Administrative	98	19.88
Personal Contact	150	30.43
Verbal	61	12.37
Aesthetic	46	9.33

[a] The n and frequency represent the number of times fields were selected. Students may choose more than once.

Table D14

Frequency with Which Values Were Used for Retrieval in Locate

VALUES IN LOCATE (N= 8755[a])	FREQ	%
INCOME.	1379	15.75
PRESTIGE.	515	5.88
INDEPENDENCE.	996	11.38
HELPING OTHERS.	863	9.86
SECURITY.	1070	12.22
VARIETY.	1048	11.97
LEADERSHIP.	436	4.98
INTEREST FIELD.	1165	13.31
LEISURE.	543	6.20
EARLY ENTRY.	740	8.45

---

[a] The _n_ represents the total number of selections, not the number of students using the Locate system.

Table D15

Level or Category of Specification Used in Locate

```
INCOME SPEC LEVELS (N= 1379 )                      FREQ          %
                                                   ----          -
    LESS THAN $8,000 IS OK.                          41       2.97
    MORE THAN $8,000.                               283      20.52
    MORE THAN $11,000.                              610      44.23
    MORE THAN $15,000.                              335      24.29
    MORE THAN $20,000.                              110       7.98

PRESTIGE SPEC LEVELS (N= 515 )                     FREQ          %
                                                   ----          -
    BELOW AVERAGE IS OK.                             46       8.93
    AVERAGE AMOUNT.                                 285      55.34
    MORE THAN AVERAGE AMOUNT.                       159      30.87
    GREAT AMOUNT                                     25       4.85

INDEP. SPEC LEVELS (N= 996 )                       FREQ          %
                                                   ----          -
    BELOW AVERAGE IS OK.                             47       4.72
    AVERAGE AMOUNT.                                 390      39.16
    MORE THAN AVERAGE AMOUNT.                       439      44.08
    GREAT AMOUNT                                    120      12.05

HELP OTHERS SPEC LEVELS (N= 863 )                  FREQ          %
                                                   ----          -
    BELOW AVERAGE IS OK.                             60       6.95
    AVERAGE AMOUNT.                                 245      28.39
    MORE THAN AVERAGE AMOUNT.                       324      37.54
    GREAT AMOUNT                                    234      27.11

SECURITY SPEC LEVELS (N= 1070 )                    FREQ          %
                                                   ----          -
    BELOW AVERAGE IS OK.                             38       3.55
    AVERAGE AMOUNT.                                 371      34.67
    MORE THAN AVERAGE AMOUNT.                       516      48.22
    GREAT AMOUNT                                    145      13.55

VARIETY SPEC LEVELS (N= 1048 )                     FREQ          %
                                                   ----          -
    BELOW AVERAGE IS OK.                             37       3.53
    AVERAGE AMOUNT.                                 399      38.07
    MORE THAN AVERAGE AMOUNT.                       463      44.18
    GREAT AMOUNT                                    149      14.22

LEADERSHIP SPEC LEVELS (N= 436 )                   FREQ          %
                                                   ----          -
    BELOW AVERAGE IS OK.                             40       9.17
    AVERAGE AMOUNT.                                 184      42.20
    MORE THAN AVERAGE AMOUNT.                       167      38.30
    GREAT AMOUNT                                     45      10.32
```

Table D15 (continued)

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INTEREST FIELD SPECS (N= 1165 )              FREQ           %
                                             ----           -
   SCIENTIFIC.                                224       19.23
   TECHNOLOGICAL.                             133       11.42
   ADMINISTRATIVE.                            161       13.82
   PERSONAL CONTACT.                          450       38.63
   VERBAL.                                    124       10.64
   AESTHETIC.                                  73        6.27

LEISURE SPEC LEVELS (N= 543 )                FREQ           %
                                             ----           -
   SMALL AMOUNT IS OK.                         25        4.60
   LESS THAN AVERAGE AMOUNT.                   55       10.13
   AVERAGE AMOUNT                             301       55.43
   MORE THAN AVERAGE AMOUNT.                  162       29.83

EARLY ENTRY SPEC LEVELS (N= 740 )            FREQ           %
                                             ----           -
   5 OR MORE YEARS.                           118       15.95
   4 YEARS.                                   263       35.54
   2 OR 3 YEARS.                              300       40.54
   1 YEAR OR LESS.                             59        7.97
```

Table D16

OCCUPATIONS USED IN LOCATE(NOVICE & INITIATE) (N= 7325[a], 2337[b])

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	2	0.03	0	0.00
ADVERTISING COPYWRITER.	7	0.10	7	0.30
AIR COND, REFRIG, & HEAT MECH.	21	0.29	3	0.13
ACCOUNTANT.	10	0.14	1	0.04
AIRCRAFT MECHANIC.	1	0.01	1	0.04
APPLIANCE REPAIR TECHNICIAN.	2	0.03	3	0.13
ARCHITECT.	42	0.57	1	0.04
AUTOMOBILE SALESWORKER.	6	0.08	1	0.04
ARCH. TECH. AND DRAFTSMAN.	2	0.03	0	0.00
AVIONICS TECHNICIAN.	3	0.04	4	0.17
AUTOMOBILE MECHANIC.	11	0.15	9	0.39
ACTUARY.	36	0.49	12	0.51
BROADCAST TECHNICIAN.	18	0.25	3	0.13
BEAUTICIAN.	4	0.05	11	0.47
BOTANIST.	28	0.38	1	0.04
BOOKKEEPER.	1	0.01	10	0.43
BUSINESS MACHINE REPAIR TECH.	14	0.19	8	0.34
BANK OFFICER.	37	0.51	0	0.00
BANK TELLER.	1	0.01	0	0.00
COMMERCIAL ARTIST.	0	0.00	0	0.00
CLOTHING DESIGNER.	8	0.11	21	0.90
CHEMICAL ENGINEER.	84	1.15	5	0.21
CHEMIST.	26	0.35	16	0.68
CLERGY.	45	0.61	4	0.17
COMPUTER OPERATOR.	0	0.00	10	0.43
COMPUTER PROGRAMMER.	16	0.22	49	2.10
CIVIL ENGINEER.	188	2.57	1	0.04
DENTAL ASSISTANT.	15	0.20	44	1.88
DENTIST.	177	2.42	14	0.60
DENTAL HYGIENIST.	50	0.68	4	0.17
DRAFTSMAN.	3	0.04	14	0.60
DIETITIAN.	48	0.66	4	0.17
DIESEL MECHANIC.	7	0.10	0	0.00
DANCER AND DANCING TEACHER.	0	0.00	8	0.34
ECONOMIST.	38	0.52	2	0.09
ELECTRICAL ENGINEER.	24	0.33	4	0.17
ENGINEERING TECHNICIAN.	7	0.10	11	0.47
ELECTRONICS TECHNICIAN.	19	0.26	0	0.00
FINE ARTIST/PRIVATE ART TEACHER.	26	0.35	35	1.50
FUNERAL DIRECTOR.	93	1.27	6	0.26
FLIGHT ENGINEER.	18	0.25	0	0.00
FLIGHT ATTENDANT.	3	0.04	33	1.41
FORESTER.	100	1.37	22	0.94
GEOGRAPHER.	27	0.37	8	0.34
HOME ECONOMIST.	81	1.11	19	0.81
HOTEL/MOTEL MANAGER.	33	0.45	8	0.34
INSURANCE AGENT.	8	0.11	11	0.47
INTERIOR DESIGNER/DECORATOR.	28	0.38	48	2.05
INDUSTRIAL ENGINEER.	157	2.14	9	0.39
INDUSTRIAL TRAFFIC MANAGER.	19	0.26	1	0.04
INDUSTRIAL DESIGNER.	35	0.48	7	0.30
INSTRUMENT REPAIT TECHNICIAN.	3	0.04	1	0.04
SCIENCE LABORATORY TECHNICIAN.	1	0.01	15	0.64
LIBRARIAN.	53	0.72	4	0.17

Table D16 (continued)

LABOR RELATIONS SPECIALIST.	57	0.78	0	0.00
LIBRARY TECHNICIAN.	1	0.01	46	1.97
LAWYER.	160	2.18	9	0.39
MATHEMATICIAN.	39	0.53	39	1.67
PHYSICIAN.	157	2.14	16	0.68
MECHANICAL ENGINEER.	58	0.79	17	0.73
METEOROLOGIST.	52	0.71	1	0.04
MEDICAL RECORD ADMINISTRATOR.	10	0.14	0	0.00
MEDICAL LABORATORY TECHNICIAN.	6	0.08	0	0.00
MODEL.	6	0.08	0	0.00
MARKET RESEARCHER.	3	0.04	1	0.04
MANUFACTUPER'S SALESWORKER.	6	0.08	7	0.30
MEDICAL TECHNOLOGIST.	22	0.30	6	0.26
MUSICIAN/MUSIC TEACHER.	23	0.31	13	0.56
MACHINIST.	20	0.27	5	0.21
NURSERYMAN/LANDSCAPER.	18	0.25	0	0.00
NEWSPAPER REPORTER.	6	0.08	22	0.94
OCEANOGRAPHER.	48	0.66	10	0.43
OPTICIAN.	5	0.07	19	0.81
OCCUPATIONAL THERAPIST.	63	0.86	1	0.04
PURCHASING AGENT.	9	0.12	8	0.34
POLICE OFFICER.	24	0.33	28	1.20
PUBLIC HEALTH SPECIALITST.	55	0.75	6	0.26
PILOT.	51	0.70	23	0.98
POLITICAL SCIENTIST.	111	1.52	2	0.09
PHARMACIST.	15	0.20	0	0.00
NURSE, PRACTICAL.	2	0.03	4	0.17
PHOTOGRAPHER.	16	0.22	1	0.04
PUBLIC RELATIONS WORKER.	4	0.05	0	0.00
PHYSICIST.	4	0.05	12	0.51
PHYSICAL THERAPIST.	46	0.63	24	1.03
PERSONNEL INTERVIEWER.	85	1.16	31	1.33
PRODUCTION MANAGER.	90	1.23	46	1.97
PSYCHOLOGIST.	157	2.14	2	0.09
RADIO/TV ANNOUNCER	9	0.12	38	1.63
REHABILITATION COUNSELOR.	105	1.43	0	0.00
RECEPTIONIST.	2	0.03	0	0.00
REAL ESTATE AGENT	0	0.00	5	0.21
NURSE, REGISTERED.	28	0.38	10	0.43
RESPIRATORY THERAPIST.	46	0.63	18	0.77
RETAIL STORE MANAGER.	36	0.49	7	0.30
RADIO/TV SERVICE TECHNICIAN.	3	0.04	21	0.90
RECREATION WORKER.	45	0.61	5	0.21
SYSTEMS ANALYST	13	0.18	18	0.77
SOIL CONSERVATIONIST.	107	1.46	25	1.07
SECURITIES BROKER.	47	0.64	11	0.47
SECRETARY.	14	0.19	41	1.75
SCHOOL COUNSELOR.	99	1.35	1	0.04
STATISTICIAN.	17	0.23	4	0.17
SOCIAL SERVICE AIDE.	17	0.23	59	2.52
SPEECH PATHOLOGIST/AUDIOLOGIST.	142	1.94	1	0.04
SINGER AND SINGING TEACHER.	10	0.14	4	0.17
SURVEYOR.	8	0.11	4	0.17
SOCIAL WORKER.	23	0.31	0	0.00
TEACHER AIDE.	4	0.05	0	0.00
TELEPHONE CRAFTSWORKER.	4	0.05	3	0.13
TOOL AND DIE MAKER.	9	0.12	51	2.18
TEACHER, ELEMENTARY SCHOOL	113	1.54	11	0.47
ZOOLOGIST.	28	0.38	1	0.04
TECHNICAL WRITER.	2	0.03	0	0.00

Table D16 (continued)

TYPIST.	0	0.00	8	0.34
URBAN PLANNER.	96	1.31	14	0.60
VETERINARIAN.	65	0.89	0	0.00
WASTEWATER TREATMENT OPERATOR.	8	0.11	4	0.17
X-RAY TECHNOLOGIST.	21	0.29	64	2.74
TEACHER, ART.	188	2.57	70	3.00
TEACHER, BIOLOGY.	206	2.81	73	3.12
TEACHER, BUSINESS.	202	2.76	60	2.57
TEACHER, ENGLISH/LANG. ARTS.	156	2.13	60	2.57
TEACHER, FOREIGN LANGUAGE.	156	2.13	60	2.57
TEACHER, HISTORY/SOCIAL STUDIES.	156	2.13	66	2.82
TEACHER, INDUS. ARTS/VOC.TECH.	150	2.05	70	3.00
TEACHER, MATHEMATICS.	206	2.81	51	2.18
TEACHER, PHYSICAL EDUCATION.	113	1.54	70	3.00
TEACHER, PHYSICAL SCIENCE.	206	2.81	1	0.04
WELDER.	1	0.01	0	0.00
AEROSPACE ENGINEER.	10	0.14	11	0.47
FIREFIGHTER.	36	0.49	0	0.00
KEYPUNCH OPERATOR.	0	0.00	7	0.30
LANDSCAPE ARCHITECT.	55	0.75	1	0.04
OPERATING ROOM TECHNICIAN.	8	0.11	34	1.45
OPTOMETRIST.	159	2.17	15	0.64
TEACHER, EARLY CHILDHOOD.	54	0.74	60	2.57
TEACHER, SPECIAL EDUCATION.	156	2.13	24	1.03
CONSTRUCTION INSPECTOR.	36	0.49	1	0.04
CORRECTION OFFICER.	2	0.03	4	0.17
GEOLOGIST.	13	0.18	9	0.39
HOSPITAL ADMINISTRATOR.	58	0.79	14	0.60
PHYSICIAN'S ASSISTANT.	40	0.55	0	0.00
STENOGRAPHER.	3	0.04	4	0.17
EEG TECHNOLOGIST.	26	0.35	0	0.00
NURSING ASSISTANT.	2	0.03	8	0.34
FLORIST (RETAIL & DESIGNER).	12	0.16	69	3.81
TEACHER, VOCATIONAL/TECHNICAL.	203	2.77	16	0.68
CHEF/COOK.	29	0.40	32	1.37
PLUMBER.	106	1.45	28	1.20
FOOD SCIENTIST/TECHNOLOGIST.	108	1.47	6	0.26
TELEVISION PRODUCER/DIRECTOR.	25	0.34	9	0.39
INTERPRETER/TRANSLATOR.	69	0.94	36	1.54
LEGAL ASSISTANT.	127	1.73	8	0.34
FARMER/FARM MANAGER.	14	0.19	0	0.00

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[a] Retrievals for novices.

[b] Retrievals for initiates.

Table D17

OCCS IN COMPARE (N= 2211[a])	FREQ	%
ACTOR AND ACTRESS.	7	0.32
ADVERTISING COPYWRITER.	14	0.63
AIR COND, REFRIG, & HEAT MECH.	3	0.14
ACCOUNTANT.	38	1.72
AIRCRAFT MECHANIC.	4	0.18
APPLIANCE REPAIR TECHNICIAN.	0	0.00
ARCHITECT.	14	0.63
AUTOMOBILE SALESWORKER.	1	0.05
ARCH. TECH. AND DRAFTSMAN.	2	0.09
AVIONICS TECHNICIAN.	3	0.14
AUTOMOBILE MECHANIC.	8	0.36
ACTUARY.	20	0.90
BROADCAST TECHNICIAN.	14	0.63
BEAUTICIAN.	7	0.32
BOTANIST.	24	1.09
BOOKKEEPER.	16	0.72
BUSINESS MACHINE REPAIR TECH.	0	0.00
BANK OFFICER.	14	0.63
BANK TELLER.	6	0.27
COMMERCIAL ARTIST.	10	0.45
CLOTHING DESIGNER.	15	0.68
CHEMICAL ENGINEER.	27	1.22
CHEMIST.	17	0.77
CLERGY.	16	0.72
COMPUTER OPERATOR.	50	2.26
COMPUTER PROGRAMMER.	46	2.08
CIVIL ENGINEER.	40	1.81
DENTAL ASSISTANT.	4	0.18
DENTIST.	8	0.36
DENTAL HYGIENIST.	5	0.23
DRAFTSMAN.	3	0.14
DIETITIAN.	13	0.59
DIESEL MECHANIC.	0	0.00
DANCER AND DANCING TEACHER.	0	0.00
ECONOMIST.	12	0.54
ELECTRICAL ENGINEER.	16	0.72
ENGINEERING TECHNICIAN.	2	0.09
ELECTRONICS TECHNICIAN.	17	0.77
FINE ARTIST/PRIVATE ART TEACHER.	9	0.41
FUNERAL DIRECTOR.	13	0.59
FLIGHT ENGINER.	8	0.36
FLIGHT ATTENDANT.	13	0.59
FORESTER.	32	1.45
GEOGRAPHER.	7	0.32
HOME ECONOMIST.	15	0.68
HOTEL/MOTEL MANAGER.	18	0.81
INSURANCE AGENT.	3	0.14
INTERIOR DESIGNER/DECORATOR.	30	1.36
INDUSTRIAL ENGINEER.	30	1.36
INDUSTRIAL TRAFFIC MANAGER.	4	0.18
INDUSTRIAL DESIGNER.	8	0.36
INSTRUMENT REPAIR TECHNICIAN.	1	0.05
SCIENCE LABORATORY TECHNICIAN.	4	0.18
LIBRARIAN.	8	0.36
LABOR RELATIONS SPECIALIST.	11	0.50
LIBRARY TECHNICIAN.	3	0.14

Table D17 (continued)

LAWYER.	29	1.31
MATHEMATICIAN.	13	0.59
PHYSICIAN.	18	0.81
MECHANICAL ENGINEER.	30	1.36
METEOROLOGIST.	14	0.63
MEDICAL RECORD ADMINISTRATOR.	10	0.45
MEDICAL LABORATORY TECHNICIAN.	12	0.54
MODEL.	10	0.45
MARKET RESEARCHER.	6	0.27
MANUFACTURER'S SALESWORKER.	4	0.18
MEDICAL TECHNOLOGIST.	21	0.95
MUSICIAN/MUSIC TEACHER.	7	0.32
MACHINIST.	5	0.23
NURSERYMAN/LANDSCAPER.	4	0.18
NEWSPAPER REPORTER.	24	1.09
OCEANOGRAPHER.	13	0.59
OPTICIAN.	2	0.09
OCCUPATIONAL THERAPIST.	20	0.90
PURCHASING AGENT.	14	0.63
POLICE OFFICER.	12	0.54
PUBLIC HEALTH SPECIALITST.	28	1.27
PILOT.	14	0.63
POLITICAL SCIENTIST.	21	0.95
PHARMACIST.	10	0.45
NURSE, PRACTICAL.	6	0.27
PHOTOGRAPHER.	19	0.86
PUBLIC RELATIONS WORKER.	15	0.68
PHYSICIST.	5	0.23
PHYSICAL THERAPIST.	11	0.50
PERSONNEL INTERVIEWER.	37	1.67
PRODUCTION MANAGER.	24	1.09
PSYCHOLOGIST.	57	2.58
RADIO/TV ANNOUNCER.	27	1.22
REHABILITATION COUNSELOR.	28	1.27
RECEPTIONIST.	7	0.32
REAL ESTATE AGENT	10	0.45
NURSE, REGISTERED.	34	1.54
RESPIRATORY THERAPIST.	22	1.00
RETAIL STORE MANAGER.	20	0.90
RADIO/TV SERVICE TECHNICIAN.	0	0.00
RECREATION WORKER.	26	1.18
SYSTEMS ANALYST	16	0.72
SOIL CONSERVATIONIST.	31	1.40
SECURITIES BROKER.	12	0.54
SECRETARY.	12	0.54
SCHOOL COUNSELOR.	47	2.13
STATISTICIAN.	3	0.14
SOCIAL SERVICE AIDE.	15	0.68
SPEECH PATHOLOGIST/AUDIOLOGIST.	30	1.36
SINGER AND SINGING TEACHER.	1	0.05
SURVEYOR.	4	0.18
SOCIAL WORKER.	26	1.18
TEACHER AIDE.	5	0.23
TELEPHONE CRAFTSWORKER.	5	0.23
TOOL AND DIE MAKER.	3	0.14
TEACHER, ELEMENTARY SCHOOL	11	0.50
ZOOLOGIST.	14	0.63
TECHNICAL WRITER.	3	0.14
TYPIST.	6	0.27
URBAN PLANNER.	14	0.63

Table D17 (continued)

VETERINARIAN.	7	0.32
WASTEWATER TREATMENT OPERATOR.	1	0.05
X-RAY TECHNOLOGIST.	17	0.77
TEACHER, ART.	16	0.72
TEACHER, BIOLOGY.	13	0.59
TEACHER, BUSINESS.	12	0.54
TEACHER, ENGLISH/LANG. ARTS.	18	0.81
TEACHER, FOREIGN LANGUAGE.	0	0.00
TEACHER, HISTORY/SOCIAL STUDIES.	12	0.54
TEACHER, INDUS. ARTS/VOC.TECH.	7	0.32
TEACHER, MATHEMATICS.	8	0.36
TEACHER, PHYSICAL EDUCATION.	15	0.68
TEACHER, PHYSICAL SCIENCE.	10	0.45
WELDER.	1	0.05
AEROSPACE ENGINEER.	6	0.27
FIREFIGHTER.	3	0.14
KEYPUNCH OPERATOR.	16	0.72
LANDSCAPE ARCHITECT.	14	0.63
OPERATING ROOM TECHNICIAN.	18	0.81
OPTOMETRIST.	22	1.00
TEACHER, EARLY CHILDHOOD.	25	1.13
TEACHER, SPECIAL EDUCATION.	31	1.40
CONSTRUCTION INSPECTOR.	5	0.23
CORRECTION OFFICER.	4	0.18
GEOLOGIST.	5	0.23
HOSPITAL ADMINISTRATOR.	18	0.81
PHYSICIAN'S ASSISTANT.	35	1.58
STENOGRAPHER.	2	0.09
EEG TECHNOLOGIST.	19	0.86
NURSING ASSISTANT.	13	0.59
FLORIST (RETAIL & DESIGNER).	16	0.72
TEACHER, VOCATIONAL/TECHNICAL.	21	0.95
CHEF/COOK.	5	0.23
PLUMBER.	16	0.72
FOOD SCIENTIST/TECHNOLOGIST.	26	1.18
TELEVISION PRODUCER/DIRECTOR.	16	0.72
INTERPRETER/TRANSLATOR.	6	0.27
LEGAL ASSISTANT.	55	2.49
FARMER/FARM MANAGER.	17	0.77

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[a] Frequency indicates the total number of times an occupation was selected as a subject for inquiry by novices and initiates.

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Table D18

QUESTIONS TO COMPARE (N= 4658[a])	FREQ	%
DEFINITION OF OCCUPATION?	322	6.91
DESCRIPTION OF WORK ACTIVITIES?	353	7.58
LEVELS OF SKILLS?	181	3.89
WHERE TO GET MORE INFORMATION?	123	2.64
EDUCATION REQUIRED-EARLY ENTRY?	267	5.73
SPECIFIC OCCUPATIONAL TRAINING?	190	4.08
RELATED COLLEGE COURSES?	241	5.17
PERSONAL QUALIFICATIONS?	230	4.94
OTHER REQUIREMENTS?	84	1.80
BEGINNING SALARY?	293	6.29
AVERAGE INCOME-HIGH INCOME?	211	4.53
TOP SALARY POSSIBILITIES?	126	2.71
HOW SALARIES VARY?	90	1.93
OPPORTUNITIES TO HELP OTHERS?	99	2.13
OPPORTUNITIES FOR LEADERSHIP?	58	1.25
WHAT FIELDS OF INTEREST?	147	3.16
PRESTIGE LEVEL?	66	1.42
SPECIAL PROBLEMS?	162	3.48
PHYSICAL SURROUNDINGS?	98	2.10
LEISURE-HOURS?	137	2.94
INDEPENDENCE ON THE JOB?	123	2.64
VARIETY?	126	2.71
FRINGE BENEFITS?	101	2.17
EMPLOYMENT OUTLOOK?	249	5.35
WHERE ARE THE JOBS?	223	4.79
JOB SECURITY?	151	3.24
ADVANCEMENT?	102	2.19
HOW MANY WOMEN?	105	2.25

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[a] Frequency is the total number of times the question was chosen by novices and initiates.

Table D19

Students' Reports of Their Previous Academic Performance

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H.S.RANK (N= 217 )                            FREQ              %
                                              ----              -
   TOP FIFTH.                                   44          20.28
   2ND FIFTH.                                   70          32.26
   3RD FIFTH.                                   69          31.80
   4TH FIFTH.                                   25          11.52
   BOTTOM FIFTH.                                 9           4.15

H.S.MATH GRADES (N= 215 )                     FREQ              %
                                              ----              -
   MOSTLY A'S.                                  42          19.53
   MOSTLY B'S.                                  80          37.21
   MOSTLY C'S.                                  69          32.09
   BELOW C.                                     24          11.16

H.S.ENGLISH GRADES (N= 215 )                  FREQ              %
                                              ----              -
   MOSTLY A'S.                                  87          40.47
   MOSTLY B'S.                                  76          35.35
   MOSTLY C'S.                                  40          18.60
   BELOW C.                                     12           5.58

HELP WITH ENGLISH (N= 215 )                   FREQ              %
                                              ----              -
   YES.                                         47          21.86
   NO.                                         120          55.81
   NOT SURE.                                    48          22.33
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Table D20

Programs Chosen in Prediction (N = 564 [a])

	FREQ	%
Accounting	41	7.27
Accounting-Certificate	12	2.13
Agriculture	19	3.37
Airline-Clerical	23	4.08
Architecture and Design	25	4.43
Business Administration	47	8.33
Business Management	41	7.27
Conservation	28	4.96
Data Processing	57	10.11
Engineering-Pre	41	7.27
Finance and Banking	32	5.67
Law-Pre/Political Science	40	7.09
Occupational Therapy-Pre	39	6.91
Secondary Education	56	9.93
Social Work/Sociology	63	11.17

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[a] The _n_ represents the sum of the individual frequencies, not students.

Table D21

QUESTIONS IN PREDICTION (N= 146)	FREQ ----	% -
CHANCES IN 100 MEAN?	28	19.18
CHANCES OF PASSING COURSE?	39	26.71
HOW TO PREDICT GRADE.	18	12.33
CHANCES GOOD OR BAD.	33	22.60
SIGI RIGHT OR AM I RIGHT?	28	19.18

Table D22

OCCUPATION CHOICE IN STRATEGY (PRE^a & POST^b (N= 207 & 196)

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	0	0.00	0	0.00
ADVERTISING COPYWRITER.	0	0.00	0	0.00
AIR COND, REFRIG, & HEAT MECH.	1	0.48	0	0.00
ACCOUNTANT.	8	3.86	3	1.53
AIRCRAFT MECHANIC.	0	0.00	0	0.00
APPLIANCE REPAIR TECHNICIAN.	0	0.00	0	0.00
ARCHITECT.	6	2.90	2	1.02
AUTOMOBILE SALESWORKER.	0	0.00	0	0.00
ARCH. TECH. AND DRAFTSMAN.	0	0.00	0	0.00
AVIONICS TECHNICIAN.	0	0.00	0	0.00
AUTOMOBILE MECHANIC.	1	0.48	1	0.51
ACTUARY.	1	0.48	4	2.04
BROADCAST TECHNICIAN.	0	0.00	0	0.00
BEAUTICIAN.	0	0.00	0	0.00
BOTANIST.	1	0.48	0	0.00
BOOKKEEPER.	1	0.48	2	1.02
BUSINESS MACHINE REPAIR TECH.	0	0.00	0	0.00
BANK OFFICER.	2	0.97	2	1.02
BANK TELLER.	2	0.97	1	0.51
COMMERCIAL ARTIST.	0	0.00	0	0.00
CLOTHING DESIGNER.	0	0.00	0	0.00
CHEMICAL ENGINEER.	2	0.97	2	1.02
CHEMIST.	0	0.00	0	0.00
CLERGY.	3	1.45	4	2.04
COMPUTER OPERATOR.	9	4.35	6	3.06
COMPUTER PROGRAMMER.	6	2.90	6	3.06
CIVIL ENGINEER.	6	2.90	4	2.04
DENTAL ASSISTANT.	0	0.00	0	0.00
DENTIST.	0	0.00	0	0.00
DENTAL HYGIENIST.	2	0.97	2	1.02
DRAFTSMAN.	1	0.48	0	0.00
DIETITIAN.	0	0.00	1	0.51
DIESEL MECHANIC.	0	0.00	0	0.00
DANCER AND DANCING TEACHER.	0	0.00	0	0.00
ECONOMIST.	0	0.00	0	0.00
ELECTRICAL ENGINEER.	0	0.00	1	0.51
ENGINEERING TECHNICIAN.	0	0.00	1	0.51
ELECTRONICS TECHNICIAN.	6	2.90	5	2.55
FINE ARTIST/PRIVATE ART TEACHER.	1	0.48	1	0.51
FUNERAL DIRECTOR.	1	0.48	1	0.51
FLIGHT ENGINEER.	0	0.00	2	1.02
FLIGHT ATTENDANT.	2	0.97	1	0.51
FORESTER.	2	0.97	4	2.04
GEOGRAPHER.	1	0.48	1	0.51
HOME ECONOMIST.	1	0.48	1	0.51
HOTEL/MOTEL MANAGER.	2	0.97	2	1.02
INSURANCE AGENT.	0	0.00	0	0.00
INTERIOR DESIGNER/DECORATOR.	5	2.42	3	1.53
INDUSTRIAL ENGINEER.	1	0.48	1	0.51
INDUSTRIAL TRAFFIC MANAGER.	1	0.48	1	0.51
INDUSTRIAL DESIGNER.	1	0.43	1	0.51
INSTRUMENT REPAIT TECHNICIAN.	0	0.00	0	0.00
SCIENCE LABORATORY TECHNICIAN.	0	0.00	0	0.00
LIBRARIAN.	0	0.00	0	0.00
LABOR RELATIONS SPECIALIST.	1	0.48	1	0.51
LIBRARY TECHNICIAN.	1	0.48	0	0.00

Table D22 (continued)

LAWYER.	2	0.97	1	0.51
MATHEMATICIAN.	0	0.00	0	0.00
PHYSICIAN.	3	1.45	2	1.02
MECHANICAL ENGINEER.	1	0.48	3	1.53
METEOROLOGIST.	1	0.48	0	0.00
MEDICAL RECORD ADMINISTRATOR.	4	1.93	0	0.00
MEDICAL LABORATORY TECHNICIAN.	0	0.00	0	0.00
MODEL.	4	1.93	2	1.02
MARKET RESEARCHER.	0	0.00	0	0.00
MANUFACTURER'S SALESWORKER.	0	0.00	0	0.00
MEDICAL TECHNOLOGIST.	2	0.97	1	0.51
MUSICIAN/MUSIC TEACHER.	1	0.48	0	0.00
MACHINIST.	1	0.48	0	0.00
NURSERYMAN/LANDSCAPER.	0	0.00	0	0.00
NEWSPAPER REPORTER	1	0.48	1	0.51
OCEANOGRAPHER.	1	0.48	0	0.00
OPTICIAN.	0	0.00	0	0.00
OCCUPATIONAL THERAPIST.	0	0.00	2	1.02
PURCHASING AGENT.	2	0.97	3	1.53
POLICE OFFICER.	0	0.00	0	0.00
PUBLIC HEALTH SPECIALITST.	2	0.97	0	0.00
PILOT.	0	0.00	1	0.51
POLITICAL SCIENTIST.	0	0.00	0	0.00
PHARMACIST.	0	0.00	0	0.00
NURSE, PRACTICAL.	0	0.00	0	0.00
PHOTOGRAPHER.	1	0.48	0	0.00
PUBLIC RELATIONS WORKER.	2	0.97	0	0.00
PHYSICIST.	0	0.00	1	0.51
PHYSICAL THERAPIST.	1	0.48	1	0.51
PERSONNEL INTERVIEWER.	3	1.45	4	2.04
PRODUCTION MANAGER.	2	0.97	2	1.02
PSYCHOLOGIST.	5	2.42	4	2.04
RADIO/TV ANNOUNCER.	4	1.93	3	1.53
REHABILITATION COUNSELOR.	1	0.48	5	2.55
RECEPTIONIST.	2	0.97	2	1.02
REAL ESTATE AGENT	1	0.48	1	0.51
NURSE, REGISTERED.	3	1.45	4	2.04
RESPIRATORY THERAPIST.	0	0.00	0	0.00
RETAIL STORE MANAGER.	9	4.35	6	3.06
RADIO/TV SERVICE TECHNICIAN.	0	0.00	0	0.00
RECREATION WORKER.	0	0.00	0	0.00
SYSTEMS ANALYST	2	0.97	2	1.02
SOIL CONSERVATIONIST.	3	1.45	4	2.04
SECURITIES BROKER.	1	0.48	0	0.00
SECRETARY.	5	2.42	4	2.04
SCHOOL COUNSELOR.	2	0.97	4	2.04
STATISTICIAN.	0	0.00	0	0.00
SOCIAL SERVICE AIDE.	4	1.93	4	2.04
SPEECH PATHOLOGIST/AUDIOLOGIST.	1	0.48	2	1.02
SINGER AND SINGING TEACHER.	2	0.97	1	0.51
SURVEYOR.	0	0.00	0	0.00
SOCIAL WORKER.	2	0.97	4	2.04
TEACHER AIDE.	1	0.48	1	0.51
TELEPHONE CRAFTSWORKER.	0	0.00	1	0.51
TOOL AND DIE MAKER.	0	0.00	0	0.00
TEACHER, ELEMENTARY SCHOOL	0	0.00	0	0.00
ZOOLOGIST.	0	0.00	0	0.00
TECHNICAL WRITER.	0	0.00	0	0.00
TYPIST.	0	0.00	0	0.00
URBAN PLANNER.	0	0.00	0	0.00

Table D22 (continued)

VETERINARIAN.	1	0.48	1	0.51
WASTEWATER TREATMENT OPERATOR.	0	0.00	0	0.00
X-RAY TECHNOLOGIST.	1	0.48	1	0.51
TEACHER, ART.	1	0.48	2	1.02
TEACHER, BIOLOGY.	1	0.48	2	1.02
TEACHER, BUSINESS.	1	0.48	2	1.02
TEACHER, ENGLISH/LANG. ARTS.	2	0.97	4	2.04
TEACHER, FOREIGN LANGUAGE.	1	0.48	0	0.00
TEACHER, HISTORY/SOCIAL STUDIES.	0	0.00	0	0.00
TEACHER, INDUS. ARTS/VOC.TECH.	0	0.00	1	0.51
TEACHER, MATHEMATICS.	0	0.00	0	0.00
TEACHER, PHYSICAL EDUCATION.	2	0.97	2	1.02
TEACHER, PHYSICAL SCIENCE.	2	0.97	2	1.02
WELDER.	2	0.97	1	0.51
AEROSPACE ENGINEER.	1	0.48	1	0.51
FIREFIGHTER.	1	0.48	0	0.00
KEYPUNCH OPERATOR.	0	0.00	0	0.00
LANDSCAPE ARCHITECT.	0	0.00	0	0.00
OPERATING ROOM TECHNICIAN.	8	3.86	6	3.06
OPTOMETRIST.	2	0.97	2	1.02
TEACHER, EARLY CHILDHOOD.	4	1.93	4	2.04
TEACHER, SPECIAL EDUCATION.	0	0.00	1	0.51
CONSTRUCTION INSPECTOR.	0	0.00	0	0.00
CORRECTION OFFICER.	0	0.00	0	0.00
GEOLOGIST.	0	0.00	0	0.00
HOSPITAL ADMINISTRATOR.	0	0.00	0	0.00
PHYSICIAN'S ASSISTANT.	3	1.45	2	1.02
STENOGRAPHER.	1	0.48	1	0.51
EEG TECHNOLOGIST.	2	0.97	1	0.51
NURSING ASSISTANT.	0	0.00	1	0.51
FLORIST (RETAIL & DESIGNER).	0	0.00	1	0.51
TEACHER, VOCATIONAL/TECHNICAL.	2	0.97	2	1.02
CHEF/COOK.	2	0.97	1	0.51
PLUMBER.	1	0.48	2	1.02
FOOD SCIENTIST/TECHNOLOGIST.	1	0.48	3	1.53
TELEVISION PRODUCER/DIRECTOR.	1	0.48	1	0.51
INTERPRETER/TRANSLATOR.	0	0.00	0	0.00
LEGAL ASSISTANT.	4	1.93	6	3.06
FARMER/FARM MANAGER.	0	0.00	0	0.00

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[a] "Pre" (first two columns) means first choice before the student received information about the rewards and risks associated with the occupation.

[b] "Post" (third and fourth columns) means first choice after receiving information about rewards and risks.

Table D23

Designation of First-Choice Occupations in Strategy with Respect to Desirability Sums and Estimated Chances for Entry

DESIRABILITY OUTCOME (N = 203)	FREQ	%
OCCUPATION WITH THE HIGHEST SUM.	70	34.48
WITHIN 10 POINTS OF THE HIGHEST.	48	23.65
MORE THAN 10 POINTS BELOW HIGHEST.	85	41.87

WHICH STRATEGY (N = 196)	FREQ	%
SUM HIGH;[a] CHANCES HIGH.	79	40.31
SUM HIGH;[a] CHANCES LOW.[b]	48	24.49
SUM LOW;[c] CHANCES HIGH.	41	20.92
SUM LOW;[c] CHANCES LOW.[b]	11	5.61
SUM HIGH; CHANCES EQUAL.	15	7.65
SUM LOW;[c] CHANCES EQUAL.	2	1.02

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[a] Sum High means that the occupation had the highest Desirability Sum or came within 10 points of the highest sum.

[b] Chances Low means "chances not high"; i.e., the student estimated better chances for some other occupation in the set of three. Low does not necessarily mean lowest.

[c] Sum Low means that the Desirability Sum was not the highest or within 10 points of the highest. It does not mean that the Desirability Sum was necessarily the lowest of the three sums under consideration.

CHAPTER X

FINDINGS AT MERCER COUNTY COMMUNITY COLLEGE

Description of College, Computer Configuration, and Career Counseling Services

Mercer County Community College (MCCC) in New Jersey had an enrollment of 3,500 day students and 4,970 evening students as of December 1976. The college has two campuses--the main campus in suburban West Windsor and the James Kearney Center, about 6 miles away, in inner-city Trenton. Because of its proximity to ETS, Mercer was the site of the SIGI pilot study conducted in 1973. At that time, students at the college used a remote terminal which was linked to the ETS computer by telephone lines. In January 1974, Mercer purchased its own PDP-11/45 computer and became one of the field test sites described in this report.

Computer Configuration

In the fall of 1976, at the time the evaluation team visited Mercer, two SIGI terminals were in use--one at the main campus and one at the Kearney Center. Since the terminal at the Kearney Center was relatively new and had not been fully functional, the evaluation study was confined to the use of SIGI at the main campus only.

The SIGI terminal at the main campus was located in the counseling area on the first floor of the administration building in a small room used as a career and transfer information library, near the SIGI coordinator's office. A partition separated the terminal from the rest of the room. Two additional terminals were installed in the same area in January 1977, after the site visit by the evaluation team had been completed.

Mercer runs SIGI on a PDP-11/45 based RSTS/E system which has 80K words of core memory, hardware floating point processor, and four RK05 1.2-million-byte cartridge disk drives. The computer is located on the second floor of the administration building. The local SIGI terminals, 150 feet away, are wired in directly to the computer and are equipped with Scope 120-character-per-second electrostatic printers. The terminal at the Kearney Center is connected to the computer over dial-up lines using Vadic 3400 modems at 120 characters per second. It is equipped with a Texas Instrument printer. The SIGI software was installed in April 1975.

The RSTS system is operated by the computer services department under the direction of a systems analyst. In addition to the terminals dedicated to SIGI, Mercer has nine local terminals and three dial-up ports connected to the computer through a DH11 multiplexer. These extra terminals are used by students taking courses in data processing and engineering and for the development of computer-assisted instruction materials in mathematics, statistics, and nursing.

How reliable is this hardware configuration? To find out, we asked the test sites to keep two logs from September 1 to December 1, 1976, one by the computer operators and the other by the SIGI monitors, describing each hardware problem and, if possible, identifying its source. The logs of the computer operators were sent to ETS every time there was a problem; the logs of the SIGI monitors were collected at the end of the test period.

During the time the logs were kept there were no problems beyond what might be expected in any computer system the size of SIGI. All the components are standard, off-the-shelf equipment requiring no modification for SIGI. Problems were taken care of by means of routine service procedures.

The initial SIGI installation went very smoothly. There were some problems when the Version 1.8.3 update was installed in September 1976 but these were quickly resolved.

Career Counseling Services

Description of counseling department. Mercer has ten full-time counselors and two specialists in career counseling and placement, plus a chairperson of the counseling department. The counselors handle personal, academic, career, transfer, and pre-financial aid counseling. Academic advisement is done by the teaching faculty.

Eight of the counselors work with students who are enrolled in or considering a specific academic program, such as visual arts or business. Many of these counselors have their offices in the academic building associated with the program which they cover. Two other counselors work with students who are sponsored by the Educational Opportunity Fund Program, regardless of their program of study. In addition, there is a student services staff to provide services at the Kearney Center.

Role of SIGI in counseling program. At the time of the site visit, Mercer had no formal career counseling program. Counselors had been introduced to SIGI at a workshop conducted by SIGI staff at the college in January 1976. The workshop was designed to explain SIGI to counselors, to answer their questions, and to handle their concerns. It was not designed to develop a more comprehensive counseling program. The workshop, provided by ETS to SIGI users, was generally similar to those held at other field trial schools, although it differed in details since feedback from one workshop influenced the conduct of subsequent ones.

In 1975, prior to this workshop, Mercer had received an AIDP grant to be used in the development of a comprehensive career counseling program at the college. Under the terms of the grant, Mercer arranged for members of the SIGI staff at ETS to conduct two additional workshops for counselors in November and December 1976. The purpose of these workshops was to develop ways in which career counseling at the college could be improved, including plans to establish a new career resource center at Mercer under the AIDP grant.

The AIDP grant also provided funds to hire a professional counselor as SIGI coordinator, and the position was filled in the spring of 1976. The coordinator's duties, as conceived by the college, were (a) to implement SIGI usage throughout the college, (b) to oversee functioning of equipment and software, (c) to schedule student usage, (d) to work with counselors and students, (e) to conduct workshops, (f) to design and implement evaluative research, and (g) to explore the extension of SIGI usage. Work on Mercer's prediction and planning systems had begun before the SIGI coordinator was hired; therefore, the coordinator was not responsible for collecting the data for these systems.

At the time of the site visit, the SIGI coordinator was scheduling SIGI appointments for students at the main campus on a first-come, first-served basis from 9:00 a.m. to 8:00 p.m., Monday through Thursday, and 9:00 a.m. to 5:00 p.m. on Friday. Approximately 26-30 students used SIGI each week. There was an 8-day lag between sign-up and usage. It was anticipated that the addition of two new terminals would reduce the waiting period.

Most Mercer students were introduced to SIGI through an Orientation to College program, which included a unit on career guidance, and through an Orientation Day program. Many were referred by counselors or other students. Some learned about SIGI through the student handbook, letters mailed periodically by the SIGI coordinator, newsletters, or posters.

No special tests were administered at Mercer in connection with SIGI, although all students were required to take the Comparative Guidance and Placement (CGP) test as part of the admissions procedure. CGP scores could be used by students in obtaining predictions from SIGI. The SIGI coordinator administered written evaluation questionnaires to students before and after SIGI.

Students who used SIGI were not required to see a counselor when they finished. However, students who were referred by counselors were encouraged to make a follow-up appointment with their counselor, the chairperson of the counseling department, or the SIGI coordinator.

Impact on Students

To measure the impact of SIGI on its users, we interviewed a few students at each college who had gone through SIGI, and we had questionnaires administered to a sample of SIGI users (experimentals) and a sample of students who had not used SIGI (controls). The colleges themselves selected the students to be interviewed and to receive the questionnaires, following our guidelines to the extent possible. This section of this chapter discusses our findings from these two instruments at MCCC.

Ten students were selected for interview. Our proximity to MCCC gave us a rare opportunity to follow the interview subjects as they went through SIGI. We interviewed them before they went on the system and periodically thereafter. In this way we were able to see what their initial state of mind was and what their expectations were. In effect, the 10 students became their own controls.

As to the questionnaires, our guidelines asked that the sample of experimentals be drawn from students who had completed the six sections of SIGI at least once and that the sample of controls be selected from the population of students who were interested in using SIGI but had not yet been scheduled to do so (see Appendix D, letter to the college). The MCCC coordinator did not find it expedient to follow these guidelines. Instead, about two-fifths of the experimentals had not yet completed all six sections of SIGI, and the control questionnaires were given mainly to students who were at the college for freshman orientation prior to starting classes. Consequently, no more than three-fifths of the experimentals can be said to have experienced the "treatment," and the controls were distributed differently from the experimentals with respect to enrollment status. These departures from requested procedure have undoubtedly influenced the findings; to what extent, we cannot determine.

Interviews

Sandy. Sandy was a 26-year-old licensed practical nurse. Through assistance of financial aid, she was able to enroll full time in the two-year program at Mercer College. Her short-term goal, she said in her pre-SIGI interview, was to improve her economic lot by becoming a registered nurse, but she doubted that that occupation would satisfy her for long. She would pursue nursing because that goal was within her immediate reach, but she regarded it as a plateau in her ascent to something else. But what else? She had a vague idea that "something in the field of psychology" might appeal to her; or school counseling, perhaps, or teaching? She had misgivings about not only her long-term goal but also her ability to achieve it. "My idea is big; it's broad," she said. "It's too broad and impractical." She discussed her qualms with her psychology instructor, who referred her to a counselor, who referred her to SIGI.

This, then, was her state of mind when she first came to the terminal. Her hope was that SIGI would help her sort out her ideas and arrive at a long-term goal. "I'd like SIGI to kind of narrow it [her range of choices] down and kind of give me some sort of direction," she said.

Inasmuch as Sandy was interviewed four more times in all as she progressed through SIGI, it was possible to trace the impact of SIGI as her experience with it accumulated. In a telephone interview, she discussed her interaction with the Values section.

Although the task of making her values explicit and ordering their priority made Sandy uncomfortable, as it does many students, she recognized that the system was providing her with the sense of direction she desired. In her final questionnaire she graded SIGI "A" on making her more aware of her values. She especially endorsed the Values Game, even though she had disliked being forced into either/or decisions. In discussing the Values Game, she said, "Looking back on it now, I'm glad I had to do it. I'm glad I couldn't go there putting the unorganized ideas I have into SIGI."

In later interviews, she expressed some confusion about the occupations that she retrieved in Locate and some surprise that Psychologist did not appear. For some reason, which she was unable to explain to the interviewer, she failed to use the features of Locate for asking why a particular occupation was not retrieved or for changing her original values/specifications. By the time she left Compare, however, she felt that the confusions and misgivings that she had experienced at the outset were beginning to dissolve. She said:

> The information I got from SIGI only increased my interest [in Psychologist]. I was starting to feel that I was pipe dreaming at 26 in starting something. From all the information, it doesn't seem unattainable to me. I did ask for what they felt personal qualifications should be . . . and I kind of felt that was a little bit of me. I could relate to that.

Sandy wanted to pursue her interest in Psychologist in the Prediction system, but she was blocked; the Humanities and Social Science program was not among those that could be predicted at that time. Instead, she got a prediction for nursing, the program she was taking. Her chances of getting C or better were 60 in 100, with 15 chances of getting an A or B. She had hoped for better news; nevertheless, she was not discouraged. She told the interviewer that she had thought about the prediction when she signed off and had begun to spend more time on her studies in order to improve her grades.

In the Planning system, Sandy continued her exploration of Psychologist and decided that the occupation lay within her reach. Since she has a child to support and only limited resources for education, she will have to make an oblique approach to the occupation. She therefore intends to include in her nursing program courses that will transfer into a four-year psychology program. This step will be a beginning. She also consulted a counselor about the requirements for transfer, examined catalogs of transfer institutions, and began inquiring about the grants and loans in the health field that had been mentioned in the financial aid displays in the Planning system. She summarized her overall plan as follows:

> Nursing will allow me to obtain and then maintain some sort of a living status, and Psychologist isn't a pipe dream, and I'd like to be working at something, but I have to be able to support myself while I'm working at whatever it may be, and I do have a little background in nursing--I'm comfortable with what I do. I'm capable of more responsibility (and responsibility and money for some reason seem to go in the same conversation), and that's why I'm going to stay with nursing. I've got to have a foundation before I can build, and I'm sorry to say that at 26 I'm still at the foundation.

In the Strategy system, Sandy seized the opportunity to reweight her values. She had discussed her values in the first two interviews, and she had been thinking about them between sessions. (She had been trying to consider occupations in terms of values from the beginning, but until she went on SIGI she had no vocabulary for making her ideas explicit.) She then included Psychologist in her set of three occupations for consideration. It received the highest Desirability Sum, and Sandy estimated better chances of successful entry for it than for the others. She then signed off because she was again running out of time, as she had done in Compare. She wanted to come back as an initiate, but she had not had an opportunity to do so at the time of the final interview. In her questionnaire she designated Strategy as the section she most wanted to return to.

What had SIGI done for Sandy? When she started, she was preparing for an occupation--nursing--that she thought would not satisfy her for long. She had only a vague perception of a more permanent goal, and she had many doubts about its practicability for her. When she signed off, she felt that many of the doubts with which she had started had been resolved. The "idea" which had been "too broad and impractical" was now both definite and--with luck and perseverance--attainable. She had wanted "some sort of direction," and she found herself, after completing SIGI, engaged in studying college catalogs, seeing counselors, and seeking sources of financial aid, as well as studying harder.

More important, however, Sandy had found a rational method that could be applied to the solution of many different problems. "I feel it is a process that students should be able to handle," she said. The word logical occurred frequently in her interview. "I keep referring to SIGI as very logical," she stated with reference to her experience in Locate. She saw the utility of assessing her values in order to determine goals. "SIGI made me realize that that's also a very logical thing to do," she remarked. She summed up her SIGI experience by saying, "Having ideas is better than none. Having logical and even obtainable ideas is even better. So if that awareness has been awakened in me, that's what SIGI has done for me." On her pre-SIGI questionnaire she agreed with the statement that she would follow the advice of a teacher, counselor, parent, or friend regarding career choice; on her post-SIGI questionnaire, she disagreed with the statement.

Nor had SIGI made her unrealistic. Some of her original ambivalence remained. She said this about her thoughts:

> There are times that I think that I should be glad to get through with this two-year program and get a job and get back out on the job market. I have a responsibility; after all, look at my age. . . . But there are other times when I'm just not satisfied. I don't want to go back into the job market . . . and stay. . . . The information in SIGI made me realize that it [Psychologist] is obtainable for me.

Other interviews. We interviewed nine other students before, during, and after the time they went on SIGI. There is not space to report their experience in any detail. It will be instructive, however, to summarize our interviews with them, since each represents a different problem with respect to career decision, and SIGI affected each in a different way.

Lillian, like Sandy, sought confirmation of a tentative long-range goal, Speech Pathologist/Audiologist in this case. Also like Sandy, she was apprehensive about her academic ability. Lillian's problem, however, was complicated by conflict with her father, who, she said, had no confidence in her ability and who discouraged her from pursuing so ambitious an occupation. A counselor had also suggested that she seek an alternative occupation. In short, she was under considerable tension. When she had finished SIGI, she felt better about herself. Through SIGI, she had learned much about Speech Pathologist/Audiologist and was confirmed in her belief that the occupation fitted her values and aspirations. Furthermore, she had discovered two contingency occupations (Social Worker and Spanish Teacher) for which early preparation is through the same Humanities and Social Science program that leads eventually to Speech Pathologist; she could fall back to them if her first choice faded from sight.

She said that as a result of the information she had obtained in SIGI, she was motivated to apply for a part-time job at a day care center in order to get "a feeling for whether I like this sort of thing and also [to] try to get my foot in the door to set up for a summertime job." She was under no illusion that SIGI had improved her academic ability, but she was prepared to take remedial work, if necessary, and to test her competence against the reality of coursework in the required program. Besides helping her focus her thinking and organize her activities, SIGI had reduced her anxiety. As she said:

> What you find out from SIGI, you can find out enough information that you can just sort of relax and not worry and wonder about a lot of things that you would have to spend so much time finding out about. It takes a lot of tension away. And anything that takes away stress and tension, I say, "Do it."

SIGI affected other students in other ways:

Paul: Aiming at foreign service by way of political science and economics (financed by a military scholarship), military service, law, and eventually foreign service itself. Because of SIGI, changed plans to allow for teaching as a contingency occupation.

Bob: Undecided whether to manage the family liquor store or prepare for another occupation. Explored several occupations suggested by Locate and decided to enter the family business.

Fred: Like Bob, torn between a sure thing (manager of a diesel repair shop) and finding an alternative. Explored his values, examined several occupations, was encouraged by favorable predictions, and eventually decided to change his major so that he could prepare to become an accountant.

There were four students with little or no idea of any occupational goal but full of hope that SIGI would deliver a prophetic statement. Although SIGI did not live up to this hope, in each case it had some positive effect. Dorothy changed her program of study in order to accommodate a tentative choice discovered in SIGI, Physical Therapist. Harriet became aware that she was drifting and made an appointment with a counselor to sort out her values. Irene learned that values and rational methods play important roles in decision-making and was motivated to write for information about several occupations; she left SIGI feeling more in control of her life. David discovered that Recreation Worker fitted his values, but he took no action to begin preparing for it and stated that SIGI had done him no good; nevertheless, comparison of his pre- and post-SIGI questionnaires showed that when he finished he was considering more occupations than when he started, knew more occupations that fitted his values, was trying to decide between two alternatives instead of none, and had a general idea of which program to enter instead of having no idea.

The aim of SIGI is to develop "the autonomous individual capable of making rational decisions." Measured against this standard, the results of the interviews are most encouraging. SIGI did not produce an "Aha!" effect, accompanied by flashes of lightning and claps of thunder. We would have been disconcerted if it had done so, because such an effect would not speak well of either the autonomy or the rationality of the student. Instead, we saw quite definite movements, both in behavior and thinking, that indicated the student was taking charge of his career decisions in some organized, goal-directed manner. The movements were not large and sometimes one doubts that they will be successful. Nevertheless, they are the students' movements (not SIGI's or a counselor's), they are not unrealistically motivated, and one suspects that the students are prepared to move in other directions if forced to do so by events.

Experimental and Control Group Questionnaires

Method of analysis. Separate questionnaires were given to experimentals (students who had used some or all sections of SIGI) and to controls (students who had not used it). This section of the report covers the responses of MCCC students to the questionnaires. Since questions 1-41 are the same for experimentals and controls, we were able to run tests of significance comparing the responses of the two groups and to present the 41 questions, together with our findings, in a single table, M1. The portions of the questionnaires that are different are in separate tables: questions 42-45 for controls in Table M4 and questions 42-88 for experimentals in Table M5. (The intact questionnaires are in Appendix D.) In all cases the numbers in the tables are percentages unless otherwise indicated.

In the tests of significance, chi-squares were computed for most questions (1-24 and 37-41). In the computation, responses in logically related categories were grouped if the expected cell sizes fell below 5; this is a requirement for chi-square. For questions 25-29, in which students used scales to rate themselves on a variety of dimensions, t-tests were done on the computed group means. Questions 31-34 comprise an information test. Wrong answers for each question were scored 1 and correct answers 2. The four scores were then added and an information test score group mean was computed. It is shown opposite question 30 in Table M1. A t-test was then done on the two means. In reporting the results of all tests of significance, we follow the convention of using a single asterisk for significance at the .05 level and double asterisks for the .01 level.

Several of the questions are open-ended. Responses to these have been placed in separate tables. Tables M2 and M3 list the occupations named by experimental and control students in response to question 30 (What occupation would you like to prepare yourself for eventually?) The responses have been grouped according to whether or not the occupation named was among those already in SIGI. Other responses that could not be quantified appear in Tables M4A, M6, and M7.

Results. Questions 1-3 give a description of the sample in terms of age, sex, and college enrollment. The experimental and control groups do not differ significantly on the first two dimensions. In both groups, more than half of the students were women and 78%-88% were between 15 and 22 years old. However, only 58% of the experimentals were freshmen, compared to 98% of the controls (as mentioned previously). This was a significant difference ($p < .01$), but we do not know what effect this difference may have had on the students' responses to the questionnaires.

Questions 4-10 concern students' assessment of their career decision-making skills. Significant differences were found in four of the seven questions: The experimental group (SIGI users) had explored more occupations than non-users (question 5) and knew more occupations that might provide desired satisfactions (question 6)--both $p < .01$. Moreover, the experimentals were more confident ($p < .05$) of their ability to predict grades (question 8), but were significantly ($p < .05$) less definite with respect to their career plans (question 7)--fewer of them were committed to a specific occupation and more of them were considering three or more different occupations. The groups were not significantly different in knowledge of rewards and satisfactions to be obtained from an occupation (question 4), specificity of career plans (question 9), and overall confidence in career decision-making skills (question 10).

Insert Table M1 about here

SIGI also seemed to stimulate activities related to career exploration (questions 11-18). Significant differences were found in responses to four of the questions: A larger proportion of the experimentals were inclined to read about occupations frequently (question 11) and, not unexpectedly, had used "a computer-based guidance system" (question 18)--both $p < .01$. In addition, more experimentals had used the college career library (question 14) and talked to a guidance counselor about careers (question 16)--both $p < .05$. No significant differences were found in the level of activity in talking with friends about careers (question 12), talking with people in the field (question 13), attending career planning workshops (question 15), or using career-related audiovisual materials (question 17).

Given the opportunity to agree or disagree with certain statements about choosing an occupation, students who had used SIGI felt significantly ($p < .01$) less need to know marriage plans (question 23) and were less inclined ($p < .05$) to follow the advice of others (question 19). No significant differences were found in the attitudes of the two groups toward the role of chance in career choice, toward conflicting advice from others, toward making their own decisions, or toward the need for making an immediate choice (questions 20, 21, 22, and 24).

Questions 25 through 29 explored the way students rated themselves as career decision-makers. For one of these questions a significant difference ($p < .05$) was found between the responses of the two groups. Controls distributed themselves closer to the "good" end of the career decision-making scale than did experimentals (question 25). We do not know the reason for this, but perhaps at this college the 40% of the "experimentals" who had not yet been through all sections of SIGI did not feel ready to claim expertise as career decision-makers. No significant difference was found in the remaining items: confidence in knowledge of occupations, how often students planned ahead, confidence in their decisions, and knowledge of goals and values (questions 26-29).

As a check on these self-ratings, four questions were included to test the students' actual knowledge of occupations (questions 30-34). Students were asked to name a first-choice occupation (question 30) and were questioned about the education required, average salary, amount of independence, and employment outlook for that occupation. Tables M2 and M3 list the occupations named by the two groups of Mercer students. They show that most of the occupations of interest to both groups are already offered by SIGI. First-choice occupations named by 37 of the 60 students in the experimental group and by 66 of the 104 students in the control group were SIGI occupations. Five students in the experimental group and 11 in the control group named identifiable occupations not in SIGI. The rest--18 students in the experimental group and 27 in the control--were unable to name a specific occupation or were undecided.

Insert Tables M2 and M3 about here

The replies to question 30 were sometimes difficult to tabulate because students often were unable to identify a specific occupation or to express clearly what they had in mind. We sometimes had to make judgments about a student's meaning. When the staff could not reach agreement, they recorded the answer as Too Vague to Classify. When the occupation named in question 30 was a SIGI occupation, we were in a position to evaluate the accuracy of the students' responses to questions 31-34 for both groups. These four questions constitute an information test, which was scored in the manner described earlier. The students who had used SIGI were found to be significantly better informed ($p < .05$).

Questions 37-41 relate to students' guidance experiences (excluding SIGI) at Mercer. For one of these questions a significant difference ($p < .01$) was found between the responses of the two groups. Two-thirds of the experimentals had seen a counselor within the last two months whereas less than a quarter of the controls had done so (question 37). This difference is probably attributable, in part, to the enrollment status of the controls, as mentioned previously. Both groups had discussed a variety of problems with their counselors (question 38). A quarter (26%) of the experimentals and 14% of the controls said they had taken a career guidance course (question 39), which (for the experimentals) was probably part of an orientation to college course, which devoted a few sessions to career guidance. A larger proportion of the experimentals rated the unit as excellent, but n's were too small to warrant tests of significance. Generally, neither group had reservations about interacting with a computer for career guidance (question 41).

The remaining four questions in the questionnaire for the control group explored attitudes toward SIGI. They are listed in Table M4. Approximately 90% of the group had heard of SIGI (question 42) and 97% wanted to use it (question 45). No one had formed an unfavorable impression of it (question 43). Members of the group had learned about it from a variety of sources (question 44).

Table M4A lists the responses of the control group to the open-ended questions.

Insert Tables M4 and M4A about here

The remaining 46 questions in the questionnaire for the experimental group sought to find out how these SIGI users rated their experience with SIGI.

When asked to give SIGI a grade (questions 42-54), more than 72% of the students graded SIGI A or B for 8 of the 13 items (interest, clarity, overall usefulness, helping with values awareness, seeing relationships between values and career decisions, finding occupations to fit values, getting information, and helping to plan a program of study at Mercer. For the other five questions, which concern choice of an occupation, understanding predictions, estimating probabilities of success, getting information about programs of study at MCCC, and learning to make career decisions, the proportion of A's and B's was over 50%. It is likely, as explained previously, that many of the "experimentals" had not yet used Prediction, Planning, and Strategy, which are the last three sections of SIGI and relate most directly to the latter set of questions.

Insert Table M5 about here

As for their experience with SIGI (question 55), 40% said that SIGI helped confirm a choice they had already made, 5% said that SIGI helped them to choose an occupation, and 48% thought that SIGI had suggested other occupations worth considering. Only 7% failed to perceive SIGI as having been directly helpful.

Questions 56-63 asked the experimental students whether they would consult SIGI, a counselor, or a combination of the two for help with occupational and educational decisions. The students would tend to choose the combination for most guidance purposes. This preference held true for planning a program of study, getting information about an occupation, confirming an occupational choice, finding out about financial aid, resolving conflicts about occupational choice, and estimating chances of success in a program. SIGI alone was preferred for finding occupations that fit values and for making values more clear. (All the experimentals can be assumed to have used the Values section, and probably more had used Locate and Compare than the last three sections.)

Two-thirds (67%) of the students who had used SIGI planned to schedule a conference with a counselor for a variety of purposes (questions 64 and 65). One student wanted to go to a counselor to discuss transfer information, an option not listed on the questionnaire. (See Table M6, question 65.)

Most of the students (79%) said that the occupations in which they were interested were actually retrieved on the basis of their values in Locate (question 66). Although they named some occupations as "missing" from SIGI (Table M6, question 67), the "occupations" they named were often not occupations at all, but general fields of interest; some were already in SIGI; some were specialties of occupations in SIGI; and some were occupations with only small numbers of workers. About 74% regarded the information in SIGI as superior to other sources of occupational information (question 68).

Insert Table M6 about here

Of the Mercer students who had used SIGI, 89% were satisfied with the 28 questions made available in Compare (question 69). Although a few students made suggestions for additions, many of these related to information in subsystems other than Compare. For example, information about "high school prerequisites" or "what schools contain the program of interest" would be found in the Planning system. (Again, we may assume that many had not yet reached the Planning system.) The questions suggested for addition are recorded in Table M6, question 69.

Regarding SIGI's style and vocabulary (question 70), 4% said that they were too difficult while 94% found them to be "just right." Since the reading level of the text was designed for community college students, this finding is particularly encouraging.

None of the students detected any sexual or racial bias in SIGI (question 71).

Sixty-two responses were made to question 72, asking about problems that might have occurred in using a computer-based system. Twenty-one percent thought there was too much reading; 14% did not understand some of the directions and 14% felt rushed while using SIGI; 13% reported that the writing on the screen caused eyestrain. Ten percent felt they had to wait too long for a SIGI appointment; 8% reported that the computer had broken down; 6% wanted to sign off SIGI, but couldn't. A variety of other irritations were mentioned by the 8% of the students who checked "Other," such as inability to skip material or to go back to correct mistakes (Table M6, question 72).

More than four-fifths (85%) of the SIGI users frequently took advantage of the opportunity to get printouts, and only two students used the printer just once or twice (question 73). Almost two-thirds (65%) tried to get more information on their own initiative after using SIGI (questions 74 and 75). The majority (54%) of the students spent between two and four hours on SIGI, and 21% spent more (question 76). As we have already indicated, 60% of those in the sample went all the way through SIGI, including Strategy, at least once; most of them took three or more sessions (questions 77 and 78). Almost three-quarters (73%) expressed an interest in securing additional time on SIGI, mostly two, three, or more sessions (questions 79 and 80).

The six subsystems of SIGI seemed to meet a variety of different needs; every section would be "used most" by at least some students, although Planning and Compare received the largest percentages of votes (26% and 24%, respectively). Values and Strategy were the systems named least often (question 81).

Students found SIGI to be comprehensive; 82% said that there was nothing more they would like it to cover (question 82). A few wrote in suggestions for improvement, such as listing occupations associated with a particular major, describing college programs nationwide, matching personality traits with occupations, and so on (Table M6, question 82). More than three-quarters (78%) said that there was no area that needed fuller coverage (question 83), but the others would have liked more material in Compare; more information about other colleges; and similar additions (Table M6, question 83). All subsystems were liked best by some students; Locate was the most popular, designated best by 28% of the group. Again, we do not know how ratings of Prediction, Planning, and Strategy were affected by the number of students not reaching those sections. The privacy that SIGI makes possible was considered very important to 25% of the group, but it made no difference to another 8% (question 85). Sixty-two percent of the group said that they had advised their college classmates to use SIGI; of these, over half (61%) had recommended it to three or more friends (questions 86 and 87).

Question 88 asked the students for suggestions for improving SIGI. The answers are listed in Table M7. Most of the suggestions were for expansion of the information or services offered by SIGI or for minor changes to enable students to move more quickly to the sections in which they were most interested. There were a few suggestions that revealed insufficient information on the part of the student. The general tone, however, was one of approval, respect, and gratitude.

Insert Table M7 about here

Impact on Counseling

Responses of the 11 Mercer College counselors who filled out questionnaires are tabulated in Table M8. (The constructed responses to the open-ended questions on that instrument are in Table M9.) Four of the 11 had never attended a SIGI workshop, since they had been hired after the ETS-conducted workshop had been given and had not received any special instruction with regard to SIGI by the Mercer counseling staff. It is possible that some of the responses would have been different if all the counselors had been exposed to a workshop.

With or without a workshop, however, the counselors were in general favorably disposed toward the idea of computer-based guidance (questions 4-8). Even the two counselors who saw computer-based guidance as a potential threat (question 6) planned to use such a system in their counseling (question 7), and all 11 had actually referred students to SIGI (question 12). Counselors who had used SIGI and had observed SIGI students thought that those students reacted favorably to SIGI (question 13) and benefited in a number of ways (question 28). They thought that the reading level of SIGI was appropriate for their students (question 32), that the occupational information was better than other sources available (question 33), and that SIGI was free from any kind of bias (question 34). Only five counselors said that students came to them with printouts (question 14), and for these counselors, interpretation of the students' printouts was not a problem. One counselor said separately that students' neglect in bringing printouts to counseling sessions was itself a problem (see Table M9). Only two counselors said that students had encountered problems with the terminals (question 15): Students wanted some way to correct erroneous inputs and some way to stop, short of completing a subsystem (Table M9).

Questions 16-23 were designed to explore the effect SIGI might have on problems that counselors face in career guidance. The chief problems were keeping up to date with occupational information and identifying sources of such information; the most frequently specified minor problems were getting students to read occupational information and selecting appropriate programs for students' goals. Four of the six problems listed were designated by several of the counselors as having felt the impact of SIGI. Only one counselor saw an effect on helping counselors find time to see all the students seeking help and none reported an effect on identifying those who need help.

Insert Table M8 about here

Ten counselors responded to questions 24-27, which explore the impact that SIGI may have exerted on counseling sessions. Of counselors who had had opportunity to observe, four thought that SIGI enabled them to see more students, whereas five noticed no change; five thought that SIGI had improved the quality of their discussions about values and career decisions, and only one saw no change in quality. Six counselors saw no change in the amount of time they spent in career counseling, while one thought his time had increased and one thought it had decreased. Three counselors thought their counseling sessions were longer because of SIGI, two thought they were shorter, and four noticed no change.

Question 28 sought to discover how SIGI had affected students' career decision-making behaviors that might be observed in counseling sessions. Seven counselors indicated they were in a position to know. For all seven questions, the majority of counselors answered yes, that SIGI students clearly rated higher than non-SIGI students. The proportion of yes-to-no responses ranged from a high of 6 to 1 (question 6) to a low of 4 to 2 (questions 4, 5, and 7).

Question 29 explored the subject of how SIGI should be fitted into the structure of the counseling department. Only one counselor accepted the idea of making SIGI available to students on an entirely ad lib basis with no counselor intervention or mandatory follow-up. All the other responses favored a structure in which the counselor would play a direct role in the career guidance process. Counselor referral to SIGI with mandatory follow-up was the structure named most frequently --nine times. One counselor suggested an alternative configuration that would make SIGI available to high school seniors and that would incorporate it into a college orientation program (See Table M9).

Counselors named some 16 occupations or occupational areas that they or their students would have liked to see in SIGI (questions 30 and 31). (Some of these were already in SIGI under different names.) Five counselors suggested improvements for SIGI (question 35). These and the suggested occupations are listed in Table M9.

Insert Table M9 about here

Usage of the System

The computer automatically records the responses that students make to most displays. Tables M10-M23 represent these summary data on students who used SIGI at Mercer County Community College. The _n_'s vary from table to table, with higher frequencies in Values, Locate, and Compare, which novices encounter first, and lower frequencies in Prediction and Strategy, which novices encounter last. The reasons for the decrease cannot be isolated. In any case, the reader should bear in mind that the summary data do not indicate the progress through SIGI of a particular group of students. They are merely a record of responses over a period of time. Some of the students were already in Planning or Strategy when the data collection began, and others were just beginning when the disk was swept clean of the accumulated data. Thus the tables are to some extent independent of one another. Nevertheless, the _n_'s are sufficiently large to reflect the way SIGI was used.

Data from the SIGI Introductory Sequence

Breakdown of the sample. Table M10 shows the breakdown of this sample by age, sex, and enrollment status. Percentages are given rather than actual numbers because students are asked about their age and enrollment status every time they sign on, since these variables may have changed between sessions.

We see that approximately 40% of "sign ons" were 18 or under--that is, they were students who had presumably gone directly to college from high school; consequently, there were proportionately fewer "older students." The sample contained more women than men, but the disproportion should not

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Insert Table M10 about here

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affect any of the data that follow, since SIGI is not programmed to differentiate between users by sex. Less than 10% of the sample had had no college experience.

Initial status with respect to career decisions. On their first pass through the introductory sequence, students respond to questions about their awareness of their occupational values, about their identification of occupations that fit their values, about their ability to predict their grades, and about their knowledge of appropriate programs to enroll in. Table M11 gives the distribution of their responses to these questions. The table reflects the state of mind of students as they begin their interaction with SIGI. We may make the following observations:

Insert Table M11 about here

1. Over a quarter of the students in the sample said they knew their values, and about half of them had a general idea of what they want from an occupation but had not analyzed their values ("Value Status").

2. They tended to feel a need for much information about which occupations fit their values.

3. Thirty-five percent of the students in the sample believed that they could predict their grades successfully in at least some programs and the same percentage believed that they could predict their grades successfully in any program.

4. Most of them had little or no idea what program to enroll in and would like help in planning.

Data from the Values System

The Values system yields measures showing the importance that students attach to each of the ten occupational values used in SIGI and also indicates the field of interest they would like to work in.

Values weights. Table M12 shows the means and standard deviations of the weights that students assigned to the values on a scale where 0 designates no importance and 8 maximum importance. The figures in the "Unrestricted" column are the weights assigned by students before they played the Values Game--i.e., the numbers represent the students' initial reactions to the definitions of the values. The "Restricted" column reflects the effects of both the Values Game and the constraint that the sum of the weights equal 40. The latter condition, of course, largely accounts for the smaller means in the Restricted column. It is not possible to separate the effects of the Values Game and the restriction to 40 points on all changes from the Unrestricted to the Restricted columns. In general, however, it would not be unreasonable to attribute changes in rank order (which occur for seven of the ten dimensions) primarily to the Values Game.

Insert Table M12 about here

Table M12 shows (a) that each of the values was important to some students; (b) that there was no serious ceiling or floor effect, since even the highest and lowest weighted values exhibited sizable variation; (c) that, in general, Interest Field, Income, Independence, and Security were the four most important values for this group, whereas Early Entry was the least important; and (d) that in reaching the 40-point limit, students selectively reduced the weights originally assigned--that is, not all weights were decreased proportionately. Students were least willing to give up Income and Interest Field and were most willing to reduce weights for Prestige, Leadership, and Early Entry.

The low weight given to Early Entry is not surprising, since all the students had already made some commitment to education beyond high school.

It is also interesting to note that the standard deviations show very little reduction. Indeed, one case (Interest Field) shows a slight increase. Thus, the restricted case does not appreciably reduce the variance of the weights.

Selection of interest field. Before weighting the value Interest Field, students indicate which one of the six fields interests them most. They are given the opportunity to change fields before they adjust their weights to sum to 40 and whenever they elect to return to the Values system to review the weights originally assigned.

Table M13 shows the number of times each field was selected. Note that "N = 889" in this table means that 889 interest field selections were made by the sample of students. Some may have chosen the same field more than once, and others may have changed fields.

Insert Table M13 about here

Table M13 shows that the Personal Contact interest field was clearly the most popular, with Scientific, Administrative, and Verbal about tied for second place. The Technological and Aesthetic fields were least popular.

Data from the Locate System

In Locate, students select a set of five values as a screen for retrieving potentially attractive occupations. The students specify a minimum return they would like on each value, and the computer then lists occupations that meet or exceed that minimum for each of the five values. Although students may choose any five of the ten SIGI values, the students are encouraged to choose their top-weighted ones.

Values selected for the screen. Table M14 shows the frequency with which each of the 10 values was selected as a member of the retrieval set. It may be inferred that students tend to use their most cherished values in Locate; the five most frequently used values are the ones with the highest mean weights in Table M12.

Insert Table M14 about here

Specification levels or categories. For each value except High Income and Interest Field the student may specify one of four possible levels; there are five levels for Income, and there are six categories (not levels) for Interest Field. Table M15 shows the frequency with which the various levels or categories were specified. Again, the *n*'s and the numbers listed in the "FREQ" column indicate the number of times a value or specification was used, not the number of students making the specifications. Also, the numbers are associated only with values/specifications that actually retrieved acceptable lists of occupations. If a student's specifications are too strict or too loose, resulting in empty lists or ones of unwieldy size, he must alter the specifications, one at a time but in any order, until he finally arrives at a set that does retrieve.

Table M15 indicates that all the degrees of specification are used.

Insert Table M15 about here

The fact that the retrieval of an empty list forces the student to lower a specification (or change interest fields) may account for the frequency with which the lowest specification appears. (A value set at the lowest level does not screen, since all occupations meet or exceed that specification.) Table M15 also shows that students tend to specify mostly average and above average levels, and that when they use Interest Field as one of their search values, the most popular field (Personal Contact) was the one most frequently chosen in the Values system.

Occupations retrieved in Locate. What occupations do these values/specifications retrieve? Table M16 lists all the occupations in SIGI at the time of the data collection and the frequency with which each was retrieved. The frequencies include the interaction of initiates (students who have gone through the six subsystems in the prescribed order and who are consequently privileged to return to any subsystem) as well as novices.

In all, 147 occupations of the 155 in SIGI were retrieved for a total of 12,102 times. As would be expected from the relative popularity of various levels of specification, professional occupations were more frequently retrieved than were nonprofessional occupations. The 8 occupations that were not retrieved are

Insert Table M16 about here

Aircraft Mechanic
Keypunch Operator
Medical Lab Technician
Model
Operating Room Technician
Science Lab Technician
Typist
Wastewater Treatment Operator

No occupation appeared more frequently than about 3.4% of the total frequency for novices and initiates. If we pool the various teaching occupations, the most frequently retrieved occupations would be

Teacher
Lawyer
Psychologist
Rehabilitation Counselor
Speech Pathologist/Audiologist
Dentist
Physician
School Counselor
Civil Engineer
Industrial Engineer

Data from the Compare System

Occupations selected for examination. Table M17 shows the frequency with which students (initiates and novices) selected occupations for examination in the Compare system. Students may select any occupations they want, but they are particularly encouraged to investigate occupations retrieved in Locate because those occupations tend to satisfy their values.

There were only three occupations (Telephone Craftsworker, Tool and Die Maker, and Instrument Repair Technician) that students never selected. Students did not confine themselves only to occupations retrieved in Locate. For example, Model, which was not retrieved at all in Locate, was selected 17 times in Compare; Medical Lab Technician, which also failed to appear in Locate, was selected 28 times. On the other hand, the secondary school teaching occupations, which were among the most frequently retrieved in Locate, were asked about in Compare with relatively low frequency. It seems possible that many students tended to avoid the teaching occupations because they knew the job market has turned sour. In general, however, the two sets of frequencies appear to be quite consistent. The occupation most frequently asked about (over 4% of the total frequency) was Psychologist. In comparing absolute frequencies of occupations retrieved in Locate with those used in Compare, one must allow for the fact that a given occupation may be retrieved several times by one student through various lists of specifications in Locate, but will probably be selected only once by that student for examination in Compare.

Insert Table M17 about here

Questions for which answers were sought. Students may ask up to 28 questions about the occupations they have selected. (For a list of the questions, see Figure 2, Chapter II.) Table M18 shows the frequency with which each of the questions was asked. All the questions were asked with considerable frequency, the highest being 7.25% of the total. The least favored were "Opportunities for leadership?" and "Prestige level?" The five most often chosen were, in order,

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Insert Table M18 about here

Description of work activities?
Education required--Early Entry?
Definition of occupation?
Employment outlook?
Beginning salary?

Data from the Prediction System

Reports of previous academic performance. Table M19 summarizes students' responses to questions about their previous academic performance. The responses are stored by the computer and may (or may not) be included among the predictor variables in any of the regression equations that compute the probability of a student's receiving various grades in a particular "key course." Table M19 shows that 65% of the Mercer County Community College students who used SIGI reported that they had ranked in the second or third fifth of their high school class and that the modal mathematics grades were mostly B's and C's. They presented a similar picture with respect to their English grades; 73% earned B's and C's, but a larger percentage reported A's in English (24%) than in math (18%). On the other hand, fewer than half of them were confident that they needed no help with English, and about one-quarter of them believed positively that they did need help. Perhaps the students did not think that a grade of B or better in high school English guaranteed sufficient mastery for college work.

Insert Table M19 about here

Programs for which predictions were requested. The list of programs for which the student can obtain predictions is different at each college. At the time of the evaluation, predictions were available in 29 programs at Mercer County Community College. Table M20 lists these programs and shows the frequency with which each was selected in the Prediction system.

Students sought predictions in all the programs except Engineering Technology--Construction/Civil and Engineering Technology--Mechanical. The programs most frequently selected were Business Administration, Law Enforcement, Community Service Assistant, and Nursing. The n's were not large, probably reflecting again that fact that 40% of the experimentals had not yet gone through all sections.

Insert Table M20 about here

Selection of questions about probability. Also available in the Prediction system are explanations of probability and prediction. The explanations are in the form of answers to five questions that the student (novice or initiate) may ask if he chooses. (See Figure 5, Chapter II for the wording of the questions.) The questions were included in SIGI because we knew from our past experience that the concept of probability is difficult for many students. The frequency with which each question was selected appears in Table M21. Each question was important to some students. Forty-five students (assuming that each student asked only one question) sought answers to one or another question. This is almost two-thirds (63%) of the students using the Prediction system, if we assume that the number of students is the same as or close to the number that reported their previous academic performance in Table M19--in the case of Mercer, 71.

Insert Table M21 about here

Data from the Strategy System

(No summary data are collected from the Planning system. Indeed, the only information from that system that is worth recording as summary data would be the names and frequencies of the occupations selected for planning.)

In Strategy, the student selects a set of three occupations and indicates which one he favors most. Then he sees the Desirability Sums of the occupations. (See Chapter II, pages 32-34 for a description of Desirability Sums.) Next, he interacts with a discussion of a decision-making strategy based on assessment of rewards and risks, after which he estimates the probabilities of his successfully completing all the requirements for entry into each of the occupations. Finally, he once again indicates which of the occupations he favors most in light of the information he has accumulated about rewards (Desirability Sums) and risks (probability of entry).

Table M22 shows, in the first two columns, the frequency with which occupations were designated first choice when the set of three occupations was selected, and, in the third and fourth columns, the frequency with which they were designated first choice after assessment of rewards and risks.

Insert Table M22 about here

We must be cautious in interpreting Table M22, since it shows frequencies of choice, not changes. We cannot infer, for instance, that no students changed their minds about an occupation that has the same "post" frequency as "pre" frequency. We must note, however, that the most popular occupations, in terms of post frequency, were Lawyer, Personnel Interviewer, Police Officer, Psychologist, and Rehabilitation and School Counselors. Also, if we list occupations with a difference of 3 or more (in either direction) between the pre and post frequencies, we see that Public Health Specialist, Political Scientist, Photographer, Art Teacher, and Early Childhood Teacher gained (+3 each), whereas Electronics Technician, Labor Relations Specialist, Medical Lab Technician, Police Officer, Registered Nurse, Recreation Worker, and Elementary School Teacher had losses (-3 each) as well as Accountant (-7).

Choice in relation to desirability outcomes. What influences students' choice of occupation in this context? Table M23 provides some insights. Under the heading "Desirability Outcome" are the frequencies with which students, in their pre choice, selected the occupation that later turned out to have the highest Desirability Sum, to come within 10 points of the highest sum[1], or to fall more than 10 points below the highest. Apparently, more than two-fifths of the students (42%) did not designate as their first choice the occupation that, as they soon learned, was the most likely to satisfy their values.

Insert Table M23 about here

The next set of figures, under the heading "Which Strategy," assesses the post choice of occupation with respect to the measures of reward and risk. The reader should understand that the options listed in the table do not all exist at the same time. For example, if the student had estimated that his chances were equal for successfully entering each of the three occupations, he would have only the last two options on the list: He could choose either the occupation with the greatest Desirability Sum or one with a smaller sum. If he had made differential estimates of success, some of the first four options would be present, but not the last two; moreover, it might be that none of the three occupations had the fortunate combination of greatest Desirability Sum and greatest chances, and therefore the student would not have the first option. The reader should also remember that Sum high means having the highest Desirability Sum or coming within 10 points of the highest.

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[1] Students are told to ignore differences of 10 points or less between Desirability Sums. For a discussion of how the 10-point "error" term was estimated, see Counselor's Handbook for SIGI (which is Appendix G of this report), pp. IX-12--IX-14.

Nevertheless, we can make some inferences. The first four categories under "Which Strategy" represent instances of differences in both sums and chances. If we make the reasonable assumption that students would nearly always choose "Sum high, chances high" when that option was present, we have left 193 instances (79+87+27) where students had to choose on the basis of highest sum, best chances, or some combination in which neither factor was best. In 79 instances (41% of the time), they selected the occupation with the highest sum; in 87 instances (45% of the time), they selected the occupation with the best chances; and in 27 instances (14% of the time), they selected an occupation that had neither the highest sum nor greatest chances. (This last is not necessarily an illogical choice, since it may be the best combination of reward and risk. See Counselor's Handbook for SIGI, which is Appendix G of this report, pages IX-25--IX-26.) There were 40 occasions when students estimated their chances as equal for all three occupations. In this situation, they made the apparently logical choice (occupation with the highest sum) 35 times and the apparently illogical one 5 times. We must be careful, however, not to infer that those 5 choices came from students who did not know what they were doing. We have learned from our interviews that behavior which appears inexplicable in printouts often has some logical explanation--even if it is only that the student was late for class and pushed the last few buttons at random to reach "sign off" as quickly as possible.

Table M1: Responses by Experimentals and Controls to Questions 1-41 of SIGI Evaluation Questionnaires

(Unless otherwise noted, all figures except n's are percent.)

PERSONAL INFORMATION

1. Age: $n_E = 60$ $n_C = 105$

C	E	
88	78	(1) 15-22
8	18	(2) 23-30
3	3	(3) Over 30
1	0	(4) Rather not say

2. Sex: $n_E = 60$ $n_C = 105$

36	48	(1) Male
64	52	(2) Female

**3. Year in college: $n_E = 60$ $n_C = 104$

98	58	(1) 1st
1	33	(2) 2nd
0	3	(3) 3rd
1	2	(4) 4th
0	3	(5) Graduate student

CAREER DECISION-MAKING

4. How well do you know what rewards and satisfactions you want from an occupation? $n_E = 60$ $n_C = 104$

13	23	(1) I know exactly what I want from an occupation.
70	62	(2) I have a general idea of what I want from an occupation.
15	15	(3) I'm not sure what I want from an occupation.
2	0	(4) I have no idea what I want from an occupation.

**5. How many occupations have you explored as possibilities for yourself? $n_E = 60$ $n_C = 104$

5	7	(1) None
58	17	(2) 1-2
30	37	(3) 3-4
7	40	(4) More than four

**6. How many of the occupations that you know about are likely to give you the satisfactions you want? $n_E = 59$ $n_C = 103$

12	5	(1) None
69	51	(2) 1-2
17	37	(3) 3-4
2	7	(4) More than 4

*7. Which of the statements below best describes how definite your career plans are? $n_E = 60$ $n_C = 105$

37	23	(1) I know exactly the occupation I want to enter.
32	32	(2) I am trying to decide between two different occupations.
17	35	(3) I am considering three or more different occupations.
14	10	(4) I do not have any specific occupation in mind at this time.

*8. How well do you think you can predict your grades in various programs at your college? $n_E = 60$ $n_C = 105$

14	30	(1) I think I could predict my grades accurately in any program of study I might take.
57	55	(2) I think I could predict my grades accurately in one or two programs, but not in all
21	12	(3) I have only a general idea of my grades in one or two programs.
8	3	(4) I can't predict my grades well in any program.

9. Which of the following best describes the present state of your plans? $n_E = 57$ $n_C = 105$

28	33	(1) I know which program to enroll in, which courses to take, and most of the other steps necessary to reach my occupational goal.
62	53	(2) I have a general idea of which program would be best, but I am not sure what other steps are necessary to reach my occupational goal.
10	14	(3) I don't know which program to take. I need help in planning my education.

Table M1 (continued)

C	E	
		10. Overall, how confident do you feel about your career decision-making skills? $\underline{n}_E = 59$ $\underline{n}_C = 105$
26	31	(1) Very confident
64	64	(2) Somewhat confident
10	5	(3) Not confident

Items 11-18 are activities related to thinking about occupations. Put a check under the heading which shows how much time you have spent on each of the activities.

	Never	Rarely	Sometimes	Often
**11. Reading about occupations. $\underline{n}_E = 58$ ($\underline{n}_C = 105$)	0(3)	17(19)	45(63)	38(15)
12. Talking with friends about the kinds of occupations they are considering. $\underline{n}_E = 54$ ($\underline{n}_C = 105$)	0(3)	19(8)	37(47)	44(42)
13. Talking with people in the field about their occupations. $\underline{n}_E = 59$ ($\underline{n}_C = 104$)	0(8)	34(20)	46(43)	20(29)
*14. Using the college's career reference library. $\underline{n}_E = 57$ ($\underline{n}_C = 104$)	32(52)	32(29)	30(13)	7(6)
15. Attending career planning workshops. $\underline{n}_E = 57$ ($\underline{n}_C = 103$)	63(65)	24(20)	9(14)	4(1)
*16. Talking to a guidance counselor about careers. $\underline{n}_E = 59$ ($\underline{n}_C = 99$)	12(23)	32(33)	44(22)	12(22)
17. Using career-related audiovisual materials. $\underline{n}_E = 55$ ($\underline{n}_C = 104$)	51(53)	34(32)	13(8)	2(7)
**18. Using a computer-based guidance system. $\underline{n}_E = 54$ ($\underline{n}_C = 104$)	15(85)	36(11)	34(4)	15(0)

For statements 19-24, put a check under the heading that best describes how you feel.

	Strongly Disagree	Disagree	Agree	Strongly Agree
*19. I would follow the advice of a teacher, counselor, parent, or friend in planning my career. $\underline{n}_E = 57$ ($\underline{n}_C = 100$)	5(1)	32(18)	56(67)	7(14)
20. Which occupation I enter will be mostly a matter of chance. $\underline{n}_E = 59$ ($\underline{n}_C = 104$)	44(41)	39(41)	15(16)	2(2)
21. Everyone seems to tell me something different, so I don't know which career to choose. $\underline{n}_E = 57$ ($\underline{n}_C = 104$)	19(23)	49(41)	26(31)	5(5)
22. I will decide for myself which occupation to choose. $\underline{n}_E = 58$ ($\underline{n}_C = 104$)	0(0)	2(6)	50(47)	48(47)
**23. In order to plan for a career, I would need to know how soon I would be getting married. $\underline{n}_E = 58$ ($\underline{n}_C = 103$)	54(28)	36(49)	7(17)	3(6)
24. There is plenty of time before I have to start thinking about choosing an occupation. $\underline{n}_E = 59$ ($\underline{n}_C = 103$)	42(42)	49(52)	7(6)	2(0)

Table M1 (continued)

* 25. Rate yourself on how good a career decision-maker you think you are.

		$\overline{X}$	S.D.
n_E = 58		6.07	1.86
n_C = 103		6.78	1.67

Look at the scale below. Think of a friend your age who, in your opinion, makes good career decisions. Consider that person at the top of the scale (10).

Think of a friend your age who is not a good career decision-maker. Consider that person at the bottom of the scale (0).

Now think about yourself as a career decision-maker. Where do you fit on this scale? Circle the appropriate number on the scale from 0 to 10.

	0	1	2	3	4	5	6	7	8	9	10
E	0	0	3	5	12	14	28	14	16	5	3
C	A 0	0	1	2	4	18	16	23	22	9	A 5

poor career decision-maker — good career decision-maker

For items 26- 29 mark an X on the part of the scale which best shows what is true of you.

26. How much do you know about occupations?

	$\overline{X}$	S.D.
n_E = 54	2.57	.74
n_C = 105	2.37	.84

	0		1		2		3		4
E	0	0	7	5	24	14	38	7	5
C	1	1	10	3	36	10	29	2	8

very little — a great deal

27. How often do you plan ahead?

	$\overline{X}$	S.D.
n_E = 58	2.89	.82
n_C = 105	2.87	1.13

	0		1		2		3		4
E	0	2	2	2	21	9	39	3	22
C	5	0	9	2	11	5	31	5	32

rarely — often

28. How do you feel after making an important decision?

	$\overline{X}$	S.D.
n_E = 58	2.78	.76
n_C = 105	2.70	.81

	0		1		2		3		4
E	2	0	3	0	17	12	47	10	9
C	1	0	6	2	23	8	42	7	11

I usually don't think I've done the right thing. — I am sure I did the right thing.

29. How clear is your knowledge of goals and values?

	$\overline{X}$	S.D.
n_E = 54	2.73	.85
n_C = 105	2.98	.87

	0		1		2		3		4
E	2	2	2	3	24	3	44	8	12
C	0	1	2	3	24	2	31	9	28

not clear — very clear

OCCUPATIONAL INFORMATION

* 30. What occupation would you most like to prepare yourself for eventually? Even if you are undecided, pick an occupation that appeals to you.

	$\overline{X}$	S.D.
n_E = 37	6.59	.90
n_C = 66	6.12	1.09

Name of occupation: Items 31+32+33+34, Information Test

Table M1 (continued)

% RIGHT | % WR.

Answer questions 31-34 in relation to the occupation named in Item 30.

E 86 | 14 | 31. To enter this occupation, how much education beyond high school would you need?
C 76 | 24

- ___ (1) None.
- ___ (2) 2 years.
- ___ (3) 4 years (bachelor's degree).
- ___ (4) 5-6 years (master's degree).
- ___ (5) 7 or more (doctorate or law degree).
- ___ (6) Other (please explain: ______________________________)
- ___ (7) I don't know.

E 76 | 24 | 32. Check the salary range that indicates the average amount of money per year earned by people in this occupation.
C 36 | 64

- ___ (1) $20,000 or more
- ___ (2) $15,000-$19,999
- ___ (3) $11,000-$14,999
- ___ (4) $8,000-$10,999
- ___ (5) $7,999 or less
- ___ (6) I don't know.

E 30 | 70 | 33. Check the one statement which best describes the amount of supervision usually received by workers in this occupation.
C 33 | 67

- ___ (1) Work without supervision; plan own work; seldom evaluated by others.
- ___ (2) Supervised weekly; follow overall assignments.
- ___ (3) Supervised daily; work under supervisor who assigns and schedules work; free to decide details of work.
- ___ (4) Supervised hourly; activities are directly supervised with little opportunity to act on your own.
- ___ (5) I don't know.

E 68 | 32 | 34. Check the one statement which best describes the future employment prospects for workers in this occupation.
C 68 | 32

- ___ (1) Excellent: Strong demand for workers; shortage of qualified people.
- ___ (2) Good: Steady demand for workers.
- ___ (3) Fair: Demand limited except in certain geographic areas OR demand is decreasing due to automation or economic conditions.
- ___ (4) Poor: Little demand, if any; the occupation is very overcrowded, and few jobs are available.
- ___ (5) I don't know.

35. What college program (major) are you presently enrolled in? ______________

36. What occupation are you preparing for in this program or major? ______________

CAREER GUIDANCE

**37. Have you seen a counselor during the last two months?

$n_E = 54$ 66 (1) Yes 34 (2) No
$n_C = 105$ 21 (1) Yes 79 (2) No

38. If yes, what thing(s) did you discuss?

$n_E = 127$
$n_C = 66$

C	E	
6	12	(1) Your values
11	19	(2) Occupational choice
7	12	(3) Occupational information
23	18	(4) Curriculum choice
26	12	(5) Course selection
6	7	(6) Chances for success
7	3	(7) Program approval
3	5	(8) Family pressures
11	9	(9) Financial aid
0	3	(10) Other (please explain: ______________________________)

Table M1 (continued)

39. Have you taken or are you presently enrolled in a career guidance course at your college?

$n_E = 54$ 26 (1) Yes 74 (2) No

$n_C = 103$ 14 86

C E

40. If yes, how would you rate it?

11 43 (1) Excellent $n_E = 14$

89 57 (2) Adequate $n_C = 9$

0 0 (3) Poor

41. How do you feel about interacting with a computer for career guidance?

66 71 (1) Favorable $n_E = 58$

34 29 (2) Neutral $n_C = 104$

0 0 (3) Unfavorable

$^{*}p < .05$

$^{**}p < .01$

Table M2

Occupations Named by Experimentals in Response to Question #30

In SIGI[a]

(37 occupations)

Accountant (2)[b]
Actor
Architect
Botanist
Civil Engineer
Computer Programmer
Dental Hygienist
Flight Attendant
Flight Engineer
Forester
Hospital Administrator
Industrial Designer
Interior Decorator
Lawyer (2)
Manufacturer's Salesworker
Nurse, Registered
Oceanographer
Physical Therapist
Physician
Pilot (2)
Police Officer
Psychologist (2)
Receptionist
Recreation Worker
Rehabilitation Counselor
Retail Store Manager
Secretary
Social Service Aide
Speech Pathologist
Teacher, Secondary (2)
T.V. Producer/Director
Veterinarian

Not in SIGI

(5 occupations)

Aviation Management
Financial Consultant
Floriculture
Recording Producer
Zookeeper

Too Vague to Classify

(18 responses)

Construction
Counselor
Data processing
History
Industrial & labor relations
Law enforcement
Legal research
Meteorologist or psychologist
Personnel work
Pro golfer or recording engineer
Radio, T.V., theatre, announcing, directing
Recreationist/Musician
Social work or field
Therapist
Visual arts (Media)
(I don't know)
(Blank) (2)

---

[a] If the occupational title used by the student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Social Worker Aide" is listed as "Social Service Aide," "Airline Pilot" as "Pilot," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table M3

Occupations Named by Controls in Response to Question #30

In SIGI[a]

(66 occupations)

- Accountant (3)[b]
- Architect
- Avionics Technician
- Civil Engineer
- Clergy
- Computer Programmer
- Dancer
- Electrical Engineer (3)
- Electronics Technician (3)
- Florist (7)
- Forester (2)
- Landscape Architect
- Lawyer (2)
- Legal Assistant
- Mechanical Engineer (2)
- Medical Lab Technician (4)
- Nurse, Registered (22)
- Nurseryman/Landscaper
- Optician
- Photographer
- Physical Therapist
- Retail Store Manager
- Secretary
- Science Lab Technician
- Stenographer
- Teacher, Biology
- Teacher, Business

Not in SIGI

(11 occupations)

- Business Executive
- Business Manager (3)
- College English Teacher
- Fashion Merchandising
- Golf-professional instructor
- Homicide Detective
- Horticultural Technician
- Psychiatrist
- Sound Technician

Too Vague to Classify

(27 responses)

- Accountant or attorney
- Art field
- Bi-lingual business organization
- Business (3)
- Computer sciences
- Conservationist
- Criminal justice
- Electronics (2)
- Environmental science
- Greenhouse-forest ranger-landscaping
- Homemaker or electrical engineering
- Law, or x-ray technologist
- Law, restaurant management
- Marketing (buying)
- Medicine
- Radio broadcasting
- Secretary or computer operator
- Secretary/Stewardess
- Teacher or state police
- Theatre, marketing, law enforcement
- Work in the mountains
- Working in a big corporation
- I don't know
- (Blank)

---

[a] If the occupational title used by student was different from that used by SIGI for the same occupation, the SIGI title appears on this table, e.g., "Minister" is listed as "Clergy," "Attorney Assistant" as "Legal Assistant," etc.

[b] If an occupation was designated more than once, the number in parentheses shows how often it was designated.

Table M4

Responses to Questions 42-45 of SIGI Evaluation Questionnaire for Controls

(Unless otherwise noted, all figures except n's are percent.)

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42. Are you aware that there is a computerized guidance system (SIGI) on campus? n = 104
89 (1) Yes 11 (2) No

43. If yes, what is your impression of SIGI? n = 94
63 (1) Favorable
29 (2) Neither favorable nor unfavorable
0 (3) Unfavorable
8 (4) No impression

44. How did you learn about SIGI? n = 102
3 (1) Friends
79 (2) Counselor
3 (3) Posters, Brochures
0 (4) Newspaper
15 (5) Other (please explain: ____________________)

45. Do you want to use SIGI? n = 100
97 (1) Yes 3 (2) No

If yes, when? ____________________

If no, why not? ____________________

PLEASE RETURN THIS QUESTIONNAIRE TO ETS IN THE ENVELOPE PROVIDED.

THANK YOU FOR YOUR COOPERATION.

Table M4A

Control Students' Responses to Open-Ended Items on the Questionnaire[a]

Question #38 (Other Reasons for Seeing a Counselor)

High school program, plus general discussion.

Question #44 (Other Ways of Learning About SIGI)

Just today.
Freshman orientation. (Mentioned by 12 students.)
Movie. (Mentioned by 3 students.)
Teacher

---

[a] Some of the responses have been slightly edited.

Table M5

Responses to Questions 42-88 of SIGI Evaluation Questionnaire for Experimentals

(Unless otherwise noted, all numbers except n's are percent.)

EVALUATION OF SIGI

Circle the grade that you would give SIGI on each of the following:

42. How interesting was SIGI to you? n = 59	40 A,	39 B,	19 C,	2 D,	0 or F
43. How clear was SIGI in giving information? n = 59	29 A,	61 B,	10 C,	0 D,	0 or F
44. Overall, how good is SIGI? n = 58	A, 22	B, 69	C, 7	D, 2	or F 0

Circle the grade that shows how useful SIGI was in each of the following:

45. Helping you decide which occupation to prepare for. n = 57	21 A,	35 B,	35 C,	5 D,	4 or F
46. Helping you become more aware of your values. n = 58	A, 47	B, 34	C, 14	D, 5	or F 0
47. Showing you the relationship between values and career decisions. n = 58	33 A,	48 B,	17 C,	2 D,	0 or F
48. Helping you find out which occupations might fit your values. n = 58	A, 31	B, 45	C, 17	D, 7	or F 0
49. Helping you get information about occupations. n = 57	A, 53	B, 33	C, 10	D, 4	or F 0
50. Helping you understand grade predictions expressed in probabilities. n = 57	19 A,	37 B,	35 C,	9 D,	0 or F
51. Helping you estimate probabilities of success in one or more programs. n = 55	18 A,	44 B,	36 C,	2 D,	0 or F
52. Giving information about programs of study at your school. n = 57	A, 26	B, 35	C, 30	D, 5	or F 4
53. Helping you plan a program appropriate for an occupation you are considering. n = 56	36 A,	36 B,	18 C,	7 D,	3 or F
54. Helping you learn how to make career decisions. n = 55	A, 25	B, 44	C, 23	D, 4	or F 2

55. What role has SIGI played in your occupational choice? n = 57

5 (1) SIGI helped me to choose an occupation.
40 (2) SIGI helped confirm the choice I had already made.
48 (3) SIGI suggested other things which I am considering.
7 (4) SIGI provided little or no help.

Table M5 (continued)

To get help with occupational and educational decisions, you can go to SIGI and to a counselor. For each of the following, (56-63), put a check under the heading which, in your opinion, represents the best source of help.

	SIGI Alone	Counselor Alone	SIGI & Counselor
56. Plan program of study n =52	6	25	69
57. Get information about occupations n =54	39	6	55
58. Confirm an occupational choice n =53	23	17	60
59. Find occupations that fit values n =55	62	2	36
60. Find out about financial aid n =53	8	43	49
61. Make values more clear n =54	61	11	28
62. Resolve conflicts about occupational choice n =52	21	17	62
63. Estimate chances of success in a program n =54	31	15	54

64. Have you scheduled or do you plan to schedule an appointment with a counselor as a result of using SIGI? n =54 67 (1) Yes 33 (2) No

65. If yes, what was or will be the purpose of this visit? Check all the topics you discussed or plan to discuss. n =169
9 (1) Your values
15 (2) Occupational choice
13 (3) Occupational information
14 (4) Curriculum choice
14 (5) Course selection
10 (6) Chances for success
5 (7) Program approval
2 (8) Family pressures
7 (9) Financial aid
10 (10) SIGI print-outs
1 (11) Other (please explain: ____________________)

66. In using SIGI, did the occupations of interest to you show up on the list determined by your values? n =53 79 (1) Yes 21 (2) No

67. Were there any occupations missing from SIGI that you were interested in?
____(1) Yes ____(2) No

If yes, name them: ____________________

68. Compared to other kinds of occupational information, how would you rate the occupational information presented in SIGI? n =54
74 (1) Better
26 (2) About the same
0 (3) Worse

69. SIGI has 28 questions you can ask about occupations. Are there other questions about occupations that you wish had been in SIGI? n =53 11 (1) Yes 89 (2) No

If yes, what question(s) would you add to the SIGI list?

Table M5 (continued)

70. How would you rate SIGI's writing style and vocabulary? n = 55
4 (1) Too difficult
94 (2) Just right
2 (3) Too simple

71. Did you find sexual, racial, or other bias in SIGI? 0 (1) Yes 100 (2) No

If yes, give examples: n = 56

72. Below is a list of problems that may have occurred in using SIGI. Check any that you experienced: n = 62
14 (1) I did not understand some of the directions.
13 (2) The writing on the screen strained my eyes.
10 (3) I had to wait too long for an appointment to use SIGI.
21 (4) There was too much reading.
4 (5) I felt rushed while using SIGI.
8 (6) The computer broke down while I was using SIGI.
0 (7) The writing on the screen was jumbled.
6 (8) I wanted to sign off SIGI, but couldn't.
8 (9) Other (please explain: ______________________________)

73. How often did you request a print-out on SIGI? n = 55
85 (1) Frequently
13 (2) Sometimes
2 (3) Once or twice
0 (4) Never

74. After using the computer, did you do anything to get more information on your own? n = 54
65 (1) Yes 35 (2) No

75. If yes, what did you do? n = 45
51 (1) Read
36 (2) Spoke to people in the occupation
2 (3) Used audiovisual material
11 (4) Other (please explain: ______________________________)

76. How much time did you spend on SIGI? n = 56
25 (1) 1-2 hours
54 (2) 2-4 hours
21 (3) 4-6 hours or more

77. Did you go all the way through SIGI (including the Strategy section)? n = 55
60 (1) Yes 40 (2) No

78. Over how many sessions did you use SIGI? n = 55
22 (1) One
33 (2) Two
45 (3) Three or more

79. Do you think you would profit from further use of SIGI? 73 (1) Yes 27 (2) No
n = 55

80. If yes, how many additional sessions would you like? n = 39
36 (1) One
41 (2) Two
23 (3) Three or more

Table M5 (continued)

81. Which sections would you use most? n = 106

10 (1) Values
12 (2) Locate
24 (3) Compare
18 (4) Prediction
26 (5) Planning
10 (6) Strategy

82. Is there anything SIGI didn't cover that you would like it to cover? n = 55
18 (1) Yes 82 (2) No

If yes, please explain:

83. Is there any area you wish SIGI had covered more fully? n = 55 22 (1) Yes 78 (2) No

If yes, please explain:

84. What did you like *best* about SIGI? (check *one* only) n = 87

18 (1) Learning about my values
28 (2) Finding occupations that fit my values
25 (3) Getting occupational information
3 (4) Getting grade predictions
12 (5) Learning what courses to take to prepare for an occupation
5 (6) Learning a strategy for making decisions
7 (7) Learning how values affect decisions
2 (8) Other (please explain:)

85. What you did on SIGI was completely private. How important is this fact to you? n = 54

0		1		2		3		4
8	3	14	2	14	2	24	8	21
privacy made no difference								very important

86. Have you advised friends at your college to use SIGI? n = 58 62 (1) Yes 38 (2) No

87. If yes, how many? n_E = 36

39 (1) 1-2
50 (2) 3-5
11 (3) 6 or more

88. Is there anything else you would like to tell us that would help us improve SIGI?

Table M6

Experimental Students' Responses to Open-Ended Items on the Questionnaire[a]

Question 65 (Purpose of Appointment with Counselor)

Transfer information.

Question 67 (Occupations of Interest Missing from SIGI)[b]

Title search work.
Ornamental horticulture.
Mass communication.
Legal analyst, legal technician.
Social work.
Professional recording producer.
Police.
Financial advisor.
Business administration.
Interior design, graphic artist, advertising. (Designated by 2 students.)
Microbiology.
Pilot, aviation manager, aircraft mechanic.
Secondary school teacher--political science.
Music therapy.
Typist, keypunch operator, secretary.
Probations and parole officer.
Specific pilots (corporate, agriculture, surveying).
Military.
Landscape architect; urban and environmental planning.
Additional occupations working with animals.
Photographer.
Sociology Counselor

Question 69 (Additional Questions Students Would Like to Ask)[b]

High school prerequisites.
More addresses to obtain more information about specific occupations.
What schools contain the program of interest.
An idea of what type of programs (or job opportunities) are available under a particular major.
Places for summer help that relate to job.

Question 71 (Examples of Sexual or Racial Bias in SIGI)

No responses.

Table M6 (continued)

Question 72 (Other Problems In Using SIGI)

It broke down before I arrived to use it.
Impersonal.
Not enough time on SIGI.
Printout does not work.
When I made a mistake, the directions were not clear how to fix it.
I didn't want to sign off, but I had to, after 10 minutes, between systems.
Values system (Security) needs to be clearer.
Once programmed for a specific section, SIGI could not be stopped until section was completed. This became frustrating, especially during section "planning" with the abundance of printout material.

Question 75 (Other Steps Taken to Get More Information After Using SIGI)

Went to see a job placement director.
Wrote to the airlines and one address SIGI gave me.
Counselors. (Designated by 2 students.)
Appointment with Mercer County Finance Officer.
Examined several college catalogues.

Question 82 (Additional Topics SIGI Could Have Covered)[b]

Matching personality traits with occupations.
Social work.
Geographic locations of nearest job markets.
Prerequisites.
A social science section in the prediction area.
More information on specific occupations.
Locations of colleges not only in local areas but nationwide for program of interest.
An idea of what type of programs (or job opportunities) are available under a particular major.
Additional occupations. (Designated by 2 students.)

Question 83 (Areas That Should Have Been Covered More Fully)[b]

Values systems. (Designated by 2 students.)
More occupations in horticulture.
Social work.
Compare. I would like to have some more detailed questions about the occupations. For instance, what geographical areas are best for the occupations? (Designated by 2 students.)
More information on what is required for certain occupations.
Locating.
Information about other colleges with my interests.
More information on specific occupations.
You have to go in knowing your values. If not, it might not help you, because values are what SIGI is mostly based on.
More listings of colleges which offer career choice.
Locations of colleges--not only in local area but nationwide--for program of interest.

Table M6 (continued)

Question 84 (Other Things Liked Best About SIGI)

Interesting technique.

---

[a] Some of the responses have been edited slightly.

[b] In some cases students suggested occupations or innovations already in SIGI.

Table M7

Suggestions for Improvements in SIGI Given by Experimentals in Response to Question #88[a]

Although I still have a very vague idea about my career goal, I do have a couple of ideas. The compare system helped me in this area.

I will come back for more of SIGI.

I think SIGI should be publicized more. Many students I talked to didn't even realize that it existed. I think everyone should be aware of the opportunities that SIGI provides the student.

No. I will be back to review some information in another system of SIGI. Have a nice day!!

Matching personality traits with occupations.

Everything on SIGI was very accurate. It gave information on about everything you wanted to know.

Set up more terminals.

Many people are interested in playing music, either as a hobby or as additional income. More in-depth info about music industry.

Get more!! Tell other schools to use them. This would have been helpful in high school.

Make SIGI available to high school students so that they can become aware of their values and not waste valuable time and money by changing curriculums once or twice after starting college.

Do not use the same examples all the time.

Put computer in a more comfortable area--Not so distracting.

No. Not really. (Mentioned by 4 students.)

Additional occupations.

Personally, I was expecting a test which could evaluate one's skills, emphasizing strong points and thus allowing one to choose occupational goals which others obtained who had similar test scores.

I feel limited by the occupational choices. I would like to have seen more occupations such as occupations which would have involved history. There were plenty of occupations for people with scientific interests, but not many for people with an interest in history.

When you took me off (SIGI)I missed some of the questions, I would have liked to ask, and I couldn't go back to them. I think we should be allowed to finish the section before you take me off. That was the part I was most interested in, and I didn't get a chance to get some answers.

---

[a] Some of the responses have been edited slightly.

Table M8: SIGI EVALUATION QUESTIONNAIRE FOR COUNSELORS

BACKGROUND INFORMATION

1. What percent of your time do you spend in career counseling (as opposed to personal counseling, academic advisement, etc.)?
   - 0 (1) None
   - 2 (2) 25% or less
   - 7 (3) 25-50%
   - 2 (4) 50-75%
   - 0 (5) 75-100%

2. On the average, how many students do you see each week for career counseling?
   - 0 (1) None
   - 1 (2) 1-5
   - 6 (3) 5-10
   - 4 (4) 10-20
   - 0 (5) 20 or more

3. How long are most sessions for career counseling?
   - 1 (1) less that 30 minutes
   - 10 (2) 30 minutes to an hour
   - 0 (3) one to two hours

Please indicate whether you agree or disagree with each of the following statements about computer-based guidance systems.

	Agree	Disagree	Not sure
4. Computer-based guidance systems are a passing fad.	0	6	4
5. Computer-based guidance systems can relieve counselors of many routine duties, leaving more time for professional counseling activities.	9	1	1
6. Computer-based guidance systems are a potential threat to the jobs of counselors.	2	8	1
7. I will probably never make much use of computer-based guidance systems in my work with students.	0	11	0
8. Computer-based guidance systems are capable of helping students make rational career decisions.	6	0	4

EXPERIENCE WITH SIGI

9. Have you attended a SIGI Counselors' Workshop? 6 (1) Yes 4 (2) No

10. Have you had a chance to use SIGI yourself? 11 (1) Yes 0 (2) No

11. If so, which of the SIGI subsystems have you been through?

	Once	More than once
(1) VALUES	7	3
(2) LOCATE	8	2
(3) COMPARE	6	4
(4) PREDICTION	8	1
(5) PLANNING	8	1
(6) STRATEGY	5	2

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Table M8 (continued)

12. Have you referred students to SIGI? 11 (1) Yes 0 (2) No

If so, how many?_______

For what reasons?______________________________________

13. How have most students at your college reacted to SIGI?

8 (1) Favorably
0 (2) Unfavorably
3 (3) No opportunity to observe

14. Have students come to you with their SIGI printouts? 5 (1) Yes 6 (2) No

What problems, if any, have you had in helping students interpret their printouts?

15. Have students come to you with problems related to use of the SIGI terminals?
2 (1) Yes 9 (2) No

If so, what kinds of problems have they encountered?____________________________

Prior to having SIGI at your college, to what degree was each of the following (Items 16-22) a problem to you in your role as a counselor?

		Major problem	Minor problem	No problem	Not relevant to me
16.	Getting students to read occupational information.	0	5	5	0
17.	Keeping up-to-date on occupational information.	4	4	2	0
18.	Identifying sources of occupational information.	3	3	4	0
19.	Finding time to see all the students who want the help of a counselor.	2	2	6	0
20.	Identifying students who need help with their educational and occupational plans.	0	3	7	0
21.	Selecting appropriate programs of study for students' career goals.	0	5	5	0
22.	Other:________________				

23. Has SIGI had an impact on any of the above problems? 7 (1) Yes 2 (2) No

If so, which ones? (Circle responses.) (16) (17) (18) (19) (20) (21) (22)

Please explain: 3 4 3 1 0 4 0

Table M8 (continued)

Have you noticed a change in any of the following (Items 24-27) now that SIGI is available to students at your college?

	Increase	Decrease	No change	No opportunity to observe
24. Number of students you are able to see.	4	0	5	1
25. Amount of time you spend doing career counseling.	1	1	6	2
26. Length of career counseling sessions.	3	2	4	1
27. Quality of group discussions about values and career decisions.	5	0	1	4

28. Do you know which of your students have used SIGI and which have not?
7 (1) Yes 4 (2) No

If so, in your opinion do students who have used SIGI rate higher than students who have not used it in their ability to:

	Yes	No	No opportunity to observe
(1) express clearly the satisfactions they want from an occupation?	5	1	1
(2) state their primary occupational choice?	4	1	2
(3) mention alternative possibilities?	7	0	0
(4) indicate sound reasons for their preference?	4	2	1
(5) show they are well-informed about their first-choice occupation?	4	2	1
(6) decide what programs of study are suitable for each occupation being considered?	6	1	0
(7) evaluate their chances of success in programs being considered?	4	2	1

29. How do you think students should gain access to SIGI? (Check one or more.)
1 (1) Terminals should be available to students on a first-come, first-served basis, and follow-up sessions with counselors should be optional.
3 (2) Students should be required during their first year of college to use SIGI and schedule a follow-up session with a counselor.
9 (3) Counselors should refer students to SIGI and require a follow-up session afterward.
5 (4) SIGI should be used as part of a career guidance unit in a classroom course.
1 (5) Other:

SUGGESTIONS FOR IMPROVEMENT

30. What occupations do students frequently ask about that are missing from SIGI?

31. Are there other additional occupations that you would like to see included in SIGI?
3 (1) Yes 1 (2) No

If so, please list them:

32. Are SIGI's writing style and vocabulary appropriate for your students?
7 (1) Yes 0 (2) No

If not, what changes would you suggest?

Table M8 (continued)

33. How does the occupational information in SIGI compare to other sources available to students at your college?
8 (1) Better
1 (2) About the same
0 (3) Worse

34. Did you find any sexual, racial, or other bias in SIGI? 0 (1) Yes 5 (2) No
If so, give examples:

35. What suggestions do you have for improving SIGI, the Handbook for Counselors, or the Counselors' Workshops?

OPTIONAL INFORMATION

Members of the SIGI research staff are especially interested in hearing about any personal experiences which you or your colleagues may have had in working with SIGI. Please use the space below to record any observations, amusing anecdotes, students' comments, etc., which you would like to share with us.

Name: College:

PLEASE RETURN YOUR QUESTIONNAIRE IN THE ENVELOPE PROVIDED

THANK YOU FOR YOUR COOPERATION

Table M9

Counselors' Responses to Open-Ended Items on the Counselors' Questionnaire[a]

Question 12 (Reasons for Referring Students to SIGI)

To learn more about their values to help in career planning.

I use SIGI jointly with the SCII. I feel that until the student gets his results back from the SCII, SIGI allows for active career exploration. Also, I believe its basis (i.e., values system) is a very important area to be explored by individuals.

I have referred students because (1) they lacked understanding of decision-making process, (2) it aims to help students master strategies for rational behavior in the face of uncertainty.

Clarification.

[The student was] not sure about career choices or had too many alternatives and needed to narrow down.

Initial career exploration and information gathering.

Career discovery and exploration.

To find possible career opportunities.

Seek career alternatives, etc.

Career choice decisions

Question 14 (Problems Associated with Printouts)

Only a handful [of students come to me with their SIGI printouts]. REAL PROBLEM.

Some students used SIGI minimally. Their printouts contained limited information from COMPARE. It was therefore difficult to relate occupations to values.

At times the printouts are so long that they are unwieldy. Perhaps some type of folder/file system could be set up.

Question 15 (Problems Associated with the Terminals)

Difficulty following instruction, wanting to stop in the middle of a subsystem and being unable to.

Hitting wrong key in VALUES and being unable to change their response.

Question 22 (Other Problems Associated with Career Counseling)

Although #19 [finding time to see students] hasn't been a big problem, SIGI has alleviated the time element and I've had more time to get into other areas of counseling.

Question 23 (Impact of SIGI on Counseling Problems)

COMPARE has reduced these [problems 16, 17, and 18].

16--occupational material is easily obtainable, thus more motivation to read; 17--keeping up-to-date material is extremely hard, SIGI does it for us; 21--program selection is difficult because of emphasis of students; SIGI clarifies and also "knows" the different programs.

Table M9 (continued)

Question 29, Item 5 (Other Ways of Making SIGI Available to Students)

High school seniors should use SIGI before applying to college. This may help them to make up their minds on a definite curriculum in their freshman year.

SIGI could become an integral part of an ongoing orientation program.

Question 30 (Occupations Suggested by Students for Addition to SIGI)[b]

Occupations dealing with animals.

Communications media.

Specialized health careers.

College counselor, office manager, industrial psychologist, civil and mechanical engineering technician, art therapist.

Question 31 (Occupations Suggested by Counselors for Addition to SIGI)[b]

College counselor, office manager, etc. [see above, Question 30].

Nuclear medicine technician, cytotechnologist, respiratory therapist, histologic technician, blood bank specialist.

Communications media, aviation science, health services, business (retail purchasing buyer).

Question 32 (Suggested Changes in Writing Style)

Reading level might be difficult for some students.

Question 34 (Examples of Bias in SIGI)

No responses.

Question 35 (Suggestions for Improvement)

I feel that more work should be done on the values section. I assert that students are not prepared enough to make value choices. I believe that either a different approach by SIGI or a mandatory values clarification session with the counselor is necessary.

Perhaps at the beginning of each subsection give an approximate "time of completion" estimate. This would help students judge whether or not they had time to complete the program that he/she is in. Perhaps a specialized program could be instituted for those middle-aged women returning to work.

Handbook for Counselors and/or the counselors' workshop should be written and interpreted in a less computer-oriented style.

I have not been to any workshops but I think they would be valuable. I would like to see a workshop done on the use of SIGI in career counseling.

Develop a course or seminar along the lines of the workshop for counselors for entering students.

---

[a] Some of the responses have been edited slightly.

[b] Some occupations in these fields are already in SIGI.

Table M10

Breakdown of Sample by Age, Sex, and Enrollment Status

Factor	%
Age	
18 or under	39.2
19-21	28.6
22-24	18.8
25 and over	13.4
Sex	
Male	45.9
Female	54.1
Enrollment status	
About to enter	8.1
1st semester or quarter	22.7
Completed 1 or more semesters	28.3
Other	40.9

Table M11

Initial Status with Respect to Career Decisions

```
VALUE STATUS (N= 534 )                         FREQ              %
                                               ----              -
   I KNOW WHAT I WANT.                          156          29.21
   GENERAL IDEA OF WHAT I WANT.                 251          47.00
   WOULD KNOW IF I SAW IT.                       39           7.30
   I'M IN THE DARK.                              88          16.48

OCCUPATION STATUS (N= 534 )                    FREQ              %
                                               ----              -
   I CAN LIST 3 OCCUPATIONS.                     54          10.11
   1 OR 2 OCCUPATIONS THAT FIT.                  91          17.04
   NOT SURE THEY FIT MY VALUES.                  90          16.85
   I NEED LOTS OF INFORMATION.                  299          55.99

PREDICTION STATUS (N= 534 )                    FREQ              %
                                               ----              -
   PREDICT GRADES IN ANY PROGRAM.               191          35.77
   PREDICT GRADES IN SOME PROGRAMS.             187          35.02
   GENERAL IDEA OF MY GRADES.                    97          18.16
   I CAN'T PREDICT MY GRADES.                    59          11.05

PLANNING STATUS (N= 534 )                      FREQ              %
                                               ----              -
   KNOW WHICH PROGRAM TO ENROLL IN.              92          17.23
   GENERAL IDEA WHICH IS BEST.                  210          39.33
   DON'T KNOW WHICH PROG. TO TAKE.              232          43.45
```

Table M12

Means and Standard Deviations for the 10 SIGI Values

Value	Unrestricted[a] $\bar{X}$	Unrestricted[a] S.D.	Restricted[b] $\bar{X}$	Restricted[b] S.D.
Income	5.30	1.76	4.91	1.74
Prestige	4.42	2.01	3.23	1.69
Independence	5.39	1.70	4.60	1.62
Helping Others	4.79	2.27	3.95	2.19
Security	5.31	1.99	4.48	1.78
Variety	5.18	1.96	4.22	1.82
Leadership	4.37	1.88	3.47	1.65
Interest Field	5.98	1.65	5.54	1.68
Leisure	3.93	1.85	3.34	1.63
Early Entry	3.17	2.35	2.27	1.95

[a] Students weighted each value on a scale ranging from 0 (no importance) to 8 (maximum importance), with no restriction on the magnitude of the sum of the weights.

[b] Students were forced to adjust their value weights to sum to exactly 40 points.

Table M13

Frequency with Which Each of the Six Interest Fields Was Selected

Interest Field (N = 889) [a]	Freq [a]	%
Scientific	154	17.32
Technological	82	9.22
Administrative	133	14.96
Personal Contact	286	32.17
Verbal	137	15.41
Aesthetic	97	10.91

---

[a] The n and frequency represent the number of times fields were selected. Students may choose more than once.

Table M14

Frequency with Which Values Were Used for Retrieval in Locate

---

VALUES IN LOCATE (N= 11665[a])	FREQ	%
INCOME.	1701	14.58
PRESTIGE.	691	5.92
INDEPENDENCE.	1521	13.04
HELPING OTHERS.	1084	9.29
SECURITY.	1245	10.67
VARIETY.	1404	12.04
LEADERSHIP.	667	5.72
INTEREST FIELD.	1798	15.41
LEISURE.	813	6.97
EARLY ENTRY.	741	6.35

---

[a] The n represents the total number of selections, not the number of students using the Locate system.

Table M15

Level or Category of Specification Used in Locate

```
INCOME SPEC LEVELS (N= 1701 )                    FREQ           %
                                                 ----           -
   LESS THAN $8,000 IS OK.                         79        4.64
   MORE THAN $8,000.                              295       17.34
   MORE THAN $11,000.                             635       37.33
   MORE THAN $15,000.                             499       29.34
   MORE THAN $20,000.                             193       11.35

PRESTIGE SPEC LEVELS (N= 691 )                   FREQ           %
                                                 ----           -
   BELOW AVERAGE IS OK.                            52        7.53
   AVERAGE AMOUNT.                                335       48.48
   MORE THAN AVERAGE AMOUNT.                      256       37.05
   GREAT AMOUNT                                    48        6.95

INDEP. SPEC LEVELS (N= 1521 )                    FREQ           %
                                                 ----           -
   BELOW AVERAGE IS OK.                           122        8.02
   AVERAGE AMOUNT.                                604       39.71
   MORE THAN AVERAGE AMOUNT.                      648       42.60
   GREAT AMOUNT                                   147        9.66

HELP OTHERS SPEC LEVELS (N= 1084 )               FREQ           %
                                                 ----           -
   BELOW AVERAGE IS OK.                            64        5.90
   AVERAGE AMOUNT.                                304       28.04
   MORE THAN AVERAGE AMOUNT.                      381       35.15
   GREAT AMOUNT                                   335       30.90

SECURITY SPEC LEVELS (N= 1245 )                  FREQ           %
                                                 ----           -
   BELOW AVERAGE IS OK.                            67        5.38
   AVERAGE AMOUNT.                                492       39.52
   MORE THAN AVERAGE AMOUNT.                      487       39.12
   GREAT AMOUNT                                   199       15.98


VARIETY SPEC LEVELS (N= 1404 )                   FREQ           %
                                                 ----           -
   BELOW AVERAGE IS OK.                            33        2.35
   AVERAGE AMOUNT.                                491       34.97
   MORE THAN AVERAGE AMOUNT.                      587       41.81
   GREAT AMOUNT                                   293       20.87

LEADERSHIP SPEC LEVELS (N= 667 )                 FREQ           %
                                                 ----           -
   BELOW AVERAGE IS OK.                            46        6.90
   AVERAGE AMOUNT.                                274       41.08
   MORE THAN AVERAGE AMOUNT.                      248       37.18
   GREAT AMOUNT                                    99       14.84
```

Table M15 (continued)

```
INTEREST FIELD SPECS (N= 1798 )              FREQ           %
                                             ----           -
   SCIENTIFIC.                                351       19.52
   TECHNOLOGICAL.                             107        5.95
   ADMINISTRATIVE.                            214       11.90
   PERSONAL CONTACT.                          698       38.82
   VERBAL.                                    234       13.01
   AESTHETIC.                                 194       10.79

LEISURE SPEC LEVELS (N= 813 )                FREQ           %
                                             ----           -
   SMALL AMOUNT IS OK.                         49        6.03
   LESS THAN AVERAGE AMOUNT.                   96       11.81
   AVERAGE AMOUNT                             443       54.49
   MORE THAN AVERAGE AMOUNT.                  225       27.68


EARLY ENTRY SPEC LEVELS (N= 741 )            FREQ           %
                                             ----           -
   5 OR MORE YEARS.                           126       17.00
   4 YEARS.                                   264       35.63
   2 OR 3 YEARS.                              273       36.84
   1 YEAR OR LESS.                             78       10.53
```

Table M16

OCCUPATIONS USED IN LOCATE(NOVICE & INITIATE) (N= 9583^a & 2519^b)

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	4	0.04	1	0.04
ADVERTISING COPYWRITER.	16	0.17	5	0.20
AIR COND, REFRIG, & HEAT MECH.	15	0.16	1	0.04
ACCOUNTANT.	16	0.17	0	0.00
AIRCRAFT MECHANIC.	0	0.00	0	0.00
APPLIANCE REPAIR TECHNICIAN.	2	0.02	0	0.00
ARCHITECT.	71	0.74	14	0.56
AUTOMOBILE SALESWORKER.	6	0.06	0	0.00
ARCH. TECH. AND DRAFTSMAN.	8	0.08	2	0.08
AVIONICS TECHNICIAN.	5	0.05	0	0.00
AUTOMOBILE MECHANIC.	3	0.03	0	0.00
ACTUARY.	49	0.51	9	0.36
BROADCAST TECHNICIAN.	22	0.23	2	0.08
BEAUTICIAN.	17	0.18	1	0.04
BOTANIST.	57	0.59	10	0.40
BOOKKEEPER.	1	0.01	0	0.00
BUSINESS MACHINE REPAIR TECH.	28	0.29	0	0.00
BANK OFFICER.	101	1.05	24	0.95
BANK TELLER.	1	0.01	0	0.00
COMMERCIAL ARTIST.	5	0.05	0	0.00
CLOTHING DESIGNER.	30	0.31	5	0.20
CHEMICAL ENGINEER.	117	1.22	18	0.71
CHEMIST.	17	0.18	2	0.08
CLERGY.	101	1.05	36	1.43
COMPUTER OPERATOR.	7	0.07	0	0.00
COMPUTER PROGRAMMER.	16	0.17	1	0.04
CIVIL ENGINEER.	258	2.69	59	2.34
DENTAL ASSISTANT	7	0.07	2	0.08
DENTIST	294	3.07	67	2.66
DENTAL HYGIENIST	19	0.20	6	0.24
DRAFTERSMAN	20	0.21	0	0.00
DIETITIAN	71	0.74	14	0.56
DIESEL MECHANIC	9	0.09	1	0.04
DANCER AND DANCING TEACHER	2	0.02	0	0.00
ECONOMIST	36	0.38	4	0.16
ELECTRICAL ENGINEER	56	0.58	13	0.52
ENGINEERING TECHNICIAN	16	0.17	0	0.00
ELECTRONICS TECHNICIAN	40	0.42	3	0.12
FINE ARTIST/PRIVATE ART TEACHER	19	0.20	1	0.04
FUNERAL DIRECTOR	115	1.20	31	1.23
FLIGHT ENGINEER	48	0.50	17	0.67
FLIGHT ATTENDANT	10	0.10	1	0.04
FORESTER	133	1.39	28	1.11
GEOGRAPHER	21	0.22	1	0.04
HOME ECONOMIST	180	1.88	57	2.26
HOTEL/MOTEL MANAGER	80	0.83	27	1.07
INSURANCE AGENT	29	0.30	15	0.60
INTERIOR DESIGNER/DECORATOR	45	0.47	9	0.36
INDUSTRIAL ENGINEER	244	2.55	41	1.63
INDUSTRIAL TRAFFIC MANAGER	31	0.32	5	0.20
INDUSTRIAL DESIGNER	135	1.41	16	0.64
INSTRUMENT REPAIR TECHNICIAN	2	0.02	0	0.00
SCIENCE LAB TECHNICIAN	0	0.00	0	0.00
LIBRARIAN	94	0.98	16	0.64
LABOR RELATIONS SPECIALIST	119	1.24	38	1.51
LIBRARY TECHNICIAN	4	0.04	0	0.00

Table M16 (continued)

LAWYER	327	3.41	86	3.41
MATHEMATICIAN	73	0.76	17	0.67
PHYSICIAN	294	3.07	64	2.54
MECHANICAL ENGINEER	107	1.12	18	0.71
METEOROLOGIST	64	0.67	11	0.44
MEDICAL RECORD ADMINISTRATOR	21	0.22	2	0.08
MEDICAL LAB TECHNICIAN	0	0.00	0	0.00
MODEL	0	0.00	0	0.00
MARKET RESEARCHER	12	0.13	3	0.12
MANUFACTURER'S SALESWORKER.	10	0.10	6	0.24
MEDICAL TECHNOLOGIST.	14	0.15	9	0.36
MUSICIAN/MUSIC TEACHER.	35	0.37	4	0.16
MACHINIST.	21	0.22	0	0.00
NURSERYMAN/LANDSCAPER.	39	0.41	8	0.32
NEWSPAPER REPORTER.	10	0.10	5	0.20
OCEANOGRAPHER.	88	0.92	17	0.67
OPTICIAN.	6	0.06	1	0.04
OCCUPATIONAL THERAPIST.	154	1.61	34	1.35
PURCHASING AGENT.	7	0.07	2	0.08
POLICE OFFICER.	49	0.51	26	1.03
PUBLIC HEALTH SPECIALITST.	148	1.54	50	1.98
PILOT.	53	0.55	17	0.67
POLITICAL SCIENTIST.	212	2.21	45	1.79
PHARMACIST.	12	0.13	0	0.00
NURSE, PRACTICAL.	5	0.05	1	0.04
PHOTOGRAPHER.	39	0.41	1	0.04
PUBLIC RELATIONS WORKER.	20	0.21	8	0.32
PHYSICIST.	11	0.11	2	0.08
PHYSICAL THERAPIST.	31	0.32	14	0.56
PERSONNEL INTERVIEWER.	136	1.42	36	1.43
PRODUCTION MANAGER.	96	1.00	20	0.79
PSYCHOLOGIST.	328	3.42	83	3.29
RADIO/TV ANNOUNCER.	13	0.14	7	0.28
REHABILITATION COUNSELOR.	297	3.10	105	4.17
RECEPTIONIST.	5	0.05	0	0.00
REAL ESTATE AGENT	5	0.05	4	0.16
NURSE, REGISTERED.	20	0.21	5	0.20
RESPIRATORY THERAPIST.	27	0.28	7	0.28
RETAIL STORE MANAGER.	51	0.53	13	0.52
RADIO/TV SERVICE TECHNICIAN.	3	0.03	0	0.00
RECREATION WORKER.	88	0.92	24	0.95
SYSTEMS ANALYST	30	0.31	7	0.28
SOIL CONSERVATIONIST.	186	1.94	51	2.02
SECURITIES BROKER.	103	1.07	23	0.91
SECRETARY.	37	0.39	2	0.08
SCHOOL COUNSELOR.	272	2.84	82	3.26
STATISTICIAN.	23	0.24	11	0.44
SOCIAL SERVICE AIDE.	23	0.24	12	0.48
SPEECH PATHOLOGIST/AUDIOLOGIST.	279	2.91	91	3.61
SINGER AND SINGING TEACHER.	21	0.22	3	0.12
SURVEYOR.	18	0.19	4	0.16
SOCIAL WORKER.	95	0.99	39	1.55
TEACHER AIDE.	4	0.04	3	0.12
TELEPHONE CRAFTSWORKER.	5	0.05	0	0.00
TOOL AND DIE MAKER.	6	0.06	1	0.04
TEACHER, ELEMENTARY SCHOOL	89	0.93	45	1.79
ZOOLOGIST.	57	0.59	10	0.40
TECHNICAL WRITER.	9	0.09	3	0.12
TYPIST.	0	0.00	0	0.00
URBAN PLANNER.	178	1.86	23	0.91

Table M16 (continued)

VETERINARIAN.	114	1.19	24	0.95
WASTEWATER TREATMENT OPERATOR.	0	0.00	0	0.00
X-RAY TECHNOLOGIST.	9	0.09	1	0.04
TEACHER, ART.	171	1.78	48	1.91
TEACHER, BIOLOGY.	160	1.67	58	2.30
TEACHER, BUSINESS.	151	1.58	50	1.98
TEACHER, ENGLISH/LANG. ARTS.	122	1.27	44	1.75
TEACHER, FOREIGN LANGUAGE.	122	1.27	44	1.75
TEACHER, HISTORY/SOCIAL STUDIES.	122	1.27	44	1.75
TEACHER, INDUS. ARTS/VOC.TECH.	100	1.04	35	1.39
TEACHER, MATHEMATICS.	160	1.67	58	2.30
TEACHER, PHYSICAL EDUCATION.	74	0.77	35	1.39
TEACHER, PHYSICAL SCIENCE.	160	1.67	58	2.30
WELDER.	5	0.05	0	0.00
AEROSPACE ENGINEER.	7	0.07	0	0.00
FIREFIGHTER.	31	0.32	18	0.71
KEYPUNCH OPERATOR.	0	0.00	0	0.00
LANDSCAPE ARCHITECT.	100	1.04	20	0.79
OPERATING ROOM TECHNICIAN.	0	0.00	0	0.00
OPTOMETRIST.	186	1.94	36	1.43
TEACHER, EARLY CHILDHOOD.	30	0.31	20	0.79
TEACHER, SPECIAL EDUCATION.	122	1.27	44	1.75
CONSTRUCTION INSPECTOR.	35	0.37	9	0.36
CORRECTION OFFICER.	4	0.04	2	0.08
GEOLOGIST.	26	0.27	7	0.28
HOSPITAL ADMINISTRATOR.	110	1.15	18	0.71
PHYSICIAN'S ASSISTANT.	51	0.53	13	0.52
STENOGRAPHER.	1	0.01	1	0.04
EEG TECHNOLOGIST.	1	0.01	0	0.00
NURSING ASSISTANT.	2	0.02	0	0.00
FLORIST (RETAIL & DESIGNER).	3	0.03	4	0.16
TEACHER, VOCATIONAL/TECHNICAL.	53	0.55	21	0.83
CHEF/COOK.	8	0.08	7	0.28
PLUMBER.	30	0.31	8	0.32
FOOD SCIENTIST/TECHNOLOGIST.	23	0.24	1	0.04
TELEVISION PRODUCER/DIRECTOR.	10	0.10	9	0.36
INTERPRETER/TRANSLATOR.	22	0.23	0	0.00
LEGAL ASSISTANT.	32	0.33	6	0.24
FARMER/FARM MANAGER.	12	0.13	9	0.36

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[a] Retrievals for novices

[b] Retrievals for initiates

Table M17

OCCS IN COMPARE (N= 3177^a)	FREQ	%
ACTOR AND ACTRESS.	20	0.63
ADVERTISING COPYWRITER.	39	1.23
AIR COND, REFRIG, & HEAT MECH.	9	0.28
ACCOUNTANT.	38	1.20
AIRCRAFT MECHANIC.	7	0.22
APPLIANCE REPAIR TECHNICIAN.	2	0.06
ARCHITECT.	31	0.98
AUTOMOBILE SALESWORKER.	3	0.09
ARCH. TECH. AND DRAFTSMAN.	6	0.19
AVIONICS TECHNICIAN.	5	0.16
AUTOMOBILE MECHANIC.	12	0.38
ACTUARY.	17	0.54
BROADCAST TECHNICIAN.	15	0.47
BEAUTICIAN.	13	0.41
BOTANIST.	40	1.26
BOOKKEEPER.	10	0.31
BUSINESS MACHINE REPAIR TECH.	3	0.09
BANK OFFICER.	31	0.98
BANK TELLER.	3	0.09
COMMERCIAL ARTIST.	13	0.41
CLOTHING DESIGNER.	18	0.57
CHEMICAL ENGINEER.	22	0.69
CHEMIST.	13	0.41
CLERGY.	23	0.72
COMPUTER OPERATOR.	22	0.69
COMPUTER PROGRAMMER.	38	1.20
CIVIL ENGINEER.	47	1.48
DENTAL ASSISTANT	13	0.41
DENTIST	19	0.60
DENTAL HYGIENIST	21	0.66
DRAFTERSMAN	13	0.41
DIETITIAN	26	0.82
DIESEL MECHANIC	2	0.06
DANCER AND DANCING TEACHER	6	0.19
ECONOMIST	19	0.60
ELECTRICAL ENGINEER	14	0.44
ENGINEERING TECHNICIAN	2	0.06
ELECTRONICS TECHNICIAN	12	0.38
FINE ARTIST/PRIVATE ART TEACHER	13	0.41
FUNERAL DIRECTOR	10	0.31
FLIGHT ENGINEER	19	0.60
FLIGHT ATTENDANT	27	0.85
FORESTER	48	1.51
GEOGRAPHER	5	0.16
HOME ECONOMIST	28	0.88
HOTEL/MOTEL MANAGER	23	0.72
INSURANCE AGENT	5	0.16
INTERIOR DESIGNER/DECORATOR	31	0.98
INDUSTRIAL ENGINEER	40	1.26
INDUSTRIAL TRAFFIC MANAGER	7	0.22
INDUSTRIAL DESIGNER	36	1.13
INSTRUMENT REPAIR TECHNICIAN	0	0.00
SCIENCE LAB TECHNICIAN	11	0.35
LIBRARIAN	19	0.60
LABOR RELATIONS SPECIALIST	44	1.38
LIBRARY TECHNICIAN	2	0.06

Table M17 (continued)

LAWYER	84	2.64
MATHEMATICIAN	6	0.19
PHYSICIAN	44	1.38
MECHANICAL ENGINEER	18	0.57
METEOROLOGIST	13	0.41
MEDICAL RECORD ADMINISTRATOR	8	0.25
MEDICAL LAB TECHNICIAN	28	0.88
MODEL	17	0.54
MARKET RESEARCHER	15	0.47
MANUFACTURER'S SALESWORKER.	7	0.22
MEDICAL TECHNOLOGIST.	22	0.69
MUSICIAN/MUSIC TEACHER.	18	0.57
MACHINIST.	2	0.06
NURSERYMAN/LANDSCAPER.	11	0.35
NEWSPAPER REPORTER.	26	0.82
OCEANOGRAPHER.	36	1.13
OPTICIAN.	10	0.31
OCCUPATIONAL THERAPIST.	44	1.38
PURCHASING AGENT.	20	0.63
POLICE OFFICER.	35	1.10
PUBLIC HEALTH SPECIALITST.	44	1.38
PILOT.	38	1.20
POLITICAL SCIENTIST.	50	1.57
PHARMACIST.	12	0.38
NURSE, PRACTICAL.	11	0.35
PHOTOGRAPHER.	27	0.85
PUBLIC RELATIONS WORKER.	40	1.26
PHYSICIST.	1	0.03
PHYSICAL THERAPIST.	20	0.63
PERSONNEL INTERVIEWER.	71	2.23
PRODUCTION MANAGER.	24	0.76
PSYCHOLOGIST.	141	4.44
RADIO/TV ANNOUNCER.	25	0.79
REHABILITATION COUNSELOR.	89	2.80
RECEPTIONIST.	9	0.28
REAL ESTATE AGENT	8	0.25
NURSE, REGISTERED.	26	0.82
RESPIRATORY THERAPIST.	11	0.35
RETAIL STORE MANAGER.	24	0.76
RADIO/TV SERVICE TECHNICIAN.	5	0.16
RECREATION WORKER.	40	1.26
SYSTEMS ANALYST	20	0.63
SOIL CONSERVATIONIST.	33	1.04
SECURITIES BROKER.	20	0.63
SECRETARY.	17	0.54
SCHOOL COUNSELOR.	97	3.05
STATISTICIAN.	11	0.35
SOCIAL SERVICE AIDE.	42	1.32
SPEECH PATHOLOGIST/AUDIOLOGIST.	40	1.26
SINGER AND SINGING TEACHER.	10	0.31
SURVEYOR.	5	0.16
SOCIAL WORKER.	61	1.92
TEACHER AIDE.	5	0.16
TELEPHONE CRAFTSWORKER.	0	0.00
TOOL AND DIE MAKER.	0	0.00
TEACHER, ELEMENTARY SCHOOL	23	0.72
ZOOLOGIST.	37	1.16
TECHNICAL WRITER.	11	0.35
TYPIST.	2	0.06
URBAN PLANNER.	47	1.48

Table M17 (continued)

VETERINARIAN.	20	0.63
WASTEWATER TREATMENT OPERATOR.	2	0.06
X-RAY TECHNOLOGIST.	19	0.60
TEACHER, ART.	24	0.76
TEACHER, BIOLOGY.	11	0.35
TEACHER, BUSINESS.	14	0.44
TEACHER, ENGLISH/LANG. ARTS.	14	0.44
TEACHER, FOREIGN LANGUAGE.	14	0.44
TEACHER, HISTORY/SOCIAL STUDIES.	20	0.63
TEACHER, INDUS. ARTS/VOC.TECH.	12	0.38
TEACHER, MATHEMATICS.	8	0.25
TEACHER, PHYSICAL EDUCATION.	23	0.72
TEACHER, PHYSICAL SCIENCE.	6	0.19
WELDER.	2	0.06
AEROSPACE ENGINEER.	16	0.50
FIREFIGHTER.	6	0.19
KEYPUNCH OPERATOR.	9	0.28
LANDSCAPE ARCHITECT.	15	0.47
OPERATING ROOM TECHNICIAN.	4	0.13
OPTOMETRIST.	27	0.85
TEACHER, EARLY CHILDHOOD.	28	0.88
TEACHER, SPECIAL EDUCATION.	38	1.20
CONSTRUCTION INSPECTOR.	5	0.16
CORRECTION OFFICER.	16	0.50
GEOL[illegible].	17	0.54
HOSPITAL ADMINISTRATOR.	20	0.63
PHYSICIAN'S ASSISTANT.	30	0.94
STENOGRAPHER.	13	0.41
EEG TECHNOLOGIST.	5	0.16
NURSING ASSISTANT.	3	0.09
FLORIST (RETAIL & DESIGNER).	2	0.06
TEACHER, VOCATIONAL/TECHNICAL.	11	0.35
CHEF/COOK.	2	0.06
PLUMBER.	5	0.16
FOOD SCIENTIST/TECHNOLOGIST.	12	0.38
TELEVISION PRODUCER/DIRECTOR.	8	0.25
INTERPRETER/TRANSLATOR.	5	0.16
LEGAL ASSISTANT.	13	0.41
FARMER/FARM MANAGER.	2	0.06

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[a] Frequency indicates the total number of times an occupation was selected as a subject for inquiry by novices and initiates.

Table M18

QUESTIONS IN COMPASS (N= 7948 [a])	FREQ	%
DEFINITION OF OCCUPATION?	531	6.68
DESCRIPTION OF WORK ACTIVITIES?	576	7.25
LEVELS OF SKILLS?	304	3.82
WHERE TO GET MORE INFORMATION?	294	3.70
EDUCATION REQUIRED-EARLY ENTRY?	544	6.84
SPECIFIC OCCUPATIONAL TRAINING?	289	3.64
RELATED COLLEGE COURSES?	373	4.69
PERSONAL QUALIFICATIONS?	345	4.34
OTHER REQUIREMENTS?	201	2.53
BEGINNING SALARY?	417	5.25
AVERAGE INCOME-HIGH INCOME?	372	4.68
TOP SALARY POSSIBILITIES?	206	2.59
HOW SALARIES VARY?	165	2.08
OPPORTUNITIES TO HELP OTHERS?	144	1.81
OPPORTUNITIES FOR LEADERSHIP?	102	1.28
WHAT FIELDS OF INTEREST?	265	3.33
PRESTIGE LEVEL?	121	1.52
SPECIAL PROBLEMS?	287	3.61
PHYSICAL SURROUNDINGS?	159	2.00
LEISURE-HOURS?	233	2.93
INDEPENDENCE ON THE JOB?	218	2.74
VARIETY?	203	2.55
FRINGE BENEFITS?	176	2.21
EMPLOYMENT OUTLOOK?	453	5.70
WHERE ARE THE JOBS?	346	4.35
JOB SECURITY?	224	2.82
ADVANCEMENT?	203	2.55
HOW MANY WOMEN?	197	2.48

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[a] Frequency is the total number of times the question was chosen by novices and initiates.

Table M19

Students' Reports of Their Previous Academic Performance

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H.S.RANK (N= 71 )                         FREQ          %
                                          ----          -
    TOP FIFTH.                              11      15.49
    2ND FIFTH.                              16      22.54
    3RD FIFTH.                              30      42.25
    4TH FIFTH.                              13      18.31
    BOTTOM FIFTH.                            1       1.41

H.S.MATH GRADES (N= 71 )                  FREQ          %
                                          ----          -
    MOSTLY A'S.                             13      18.31
    MOSTLY B'S.                             24      33.80
    MOSTLY C'S.                             27      38.03
    BELOW C.                                 7       9.86

H.S.ENGLISH GRADES (N= 70 )               FREQ          %
                                          ----          -
    MOSTLY A'S.                             17      24.29
    MOSTLY B'S.                             27      38.57
    MOSTLY C'S.                             24      34.29
    BELOW C.                                 2       2.86

HELP WITH ENGLISH (N= 70 )                FREQ          %
                                          ----          -
    YES.                                    18      25.71
    NO.                                     33      47.14
    NOT SURE.                               19      27.14
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Table M20

Programs Chosen in Prediction (N = 173[a])

	FREQ	%
Accounting	10	5.78
Aerospace Operations Management	4	2.31
Architectural Technology	3	1.73
Architecture	5	2.89
Business Administration	22	12.72
Community Service Assistant	12	6.94
Correction Officer	4	2.31
Data Processing	5	2.89
Engineering Science	6	3.47
Engineering Tech--Construction/Civil	0	0.00
Engineering Tech--Mechanical	0	0.00
Flight Attendant	6	3.47
General Business	8	4.62
Industrial Supervision	2	1.16
Laboratory Technology	4	2.31
Land Use Management	4	2.31
Law Enforcement Officer	15	8.67
Marketing	10	5.78
Mathematics	7	4.05
Nursing	11	6.36
Ornamental Horticulture Technology	3	1.73
Plant Science	1	.58
Pre-Mortuary Science	1	.58
Science--Biology	9	5.20
Science--Chemistry	5	2.89
Science--Computer	6	3.47
Science--Physics	1	.58
Visual Arts--Arts	5	2.89
Visual Arts--Media	5	2.89

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[a] The n represents the sum of the individual frequencies, not students.

Table M21

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QUESTIONS IN PREDICTION (N= 45 )          FREQ          %
                                          ----          -
   CHANCES IN 100 MEAN?                     13      28.89
   CHANCES OF PASSING COURSE?               14      31.11
   HOW TO PREDICT GRADE.                     4       8.89
   CHANCES GOOD OR BAD.                      6      13.33
   DID I RIGHT OR AM I RIGHT?                8      17.78
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Table M22

OCCUPATION CHOICE IN STRATEGY (PRE[a] & POST[b])(N= 396 & 355)

	FREQ	%	FREQ	%
ACTOR AND ACTRESS.	2	0.51	2	0.56
ADVERTISING COPYWRITER.	5	1.26	3	0.85
AIR COND, REFRIG, & HEAT MECH.	1	0.25	1	0.28
ACCOUNTANT.	14	3.54	7	1.97
AIRCRAFT MECHANIC.	0	0.00	0	0.00
APPLIANCE REPAIR TECHNICIAN.	0	0.00	0	0.00
ARCHITECT.	9	2.27	8	2.25
AUTOMOBILE SALESWORKER.	0	0.00	0	0.00
ARCH. TECH. AND DRAFTSMAN.	1	0.25	1	0.28
AVIONICS TECHNICIAN.	2	0.51	2	0.56
AUTOMOBILE MECHANIC.	2	0.51	2	0.56
ACTUARY.	0	0.00	2	0.56
BROADCAST TECHNICIAN.	1	0.25	1	0.28
BEAUTICIAN.	1	0.25	1	0.28
BOTANIST.	1	0.25	0	0.00
BOOKKEEPER.	1	0.25	0	0.00
BUSINESS MACHINE REPAIR TECH.	0	0.00	0	0.00
BANK OFFICER.	0	0.00	5	1.41
BANK TELLER.	0	0.00	0	0.00
COMMERCIAL ARTIST.	2	0.51	2	0.56
CLOTHING DESIGNER.	5	1.26	4	1.13
CHEMICAL ENGINEER.	2	0.51	3	0.85
CHEMIST.	5	1.26	4	1.13
CLERGY.	1	0.25	1	0.28
COMPUTER OPERATOR.	1	0.25	1	0.28
COMPUTER PROGRAMMER.	4	1.01	2	0.56
CIVIL ENGINEER.	1	0.25	2	0.56
DENTAL ASSISTANT	5	1.26	3	0.85
DENTIST	1	0.25	1	0.28
DENTAL HYGIENIST	2	0.51	0	0.00
DRAFTERSMAN	1	0.25	0	0.00
DIETITIAN	1	0.25	1	0.28
DIESEL MECHANIC	0	0.00	0	0.00
DANCER AND DANCING TEACHER	0	0.00	0	0.00
ECONOMIST	1	0.25	1	0.28
ELECTRICAL ENGINEER	2	0.51	3	0.85
ENGINEERING TECHNICIAN	1	0.25	1	0.28
ELECTRONICS TECHNICIAN	5	1.26	2	0.56
FINE ARTIST/PRIVATE ART TEACHER	3	0.76	1	0.28
FUNERAL DIRECTOR	0	0.00	0	0.00
FLIGHT ENGINEER	2	0.51	1	0.28
FLIGHT ATTENDANT	4	1.01	2	0.56
FORESTER	6	1.52	4	1.13
GEOGRAPHER	0	0.00	0	0.00
HOME ECONOMIST	2	0.51	2	0.56
HOTEL/MOTEL MANAGER	0	0.00	0	0.00
INSURANCE AGENT	1	0.25	2	0.56
INTERIOR DESIGNER/DECORATOR	6	1.52	5	1.41
INDUSTRIAL ENGINEER	3	0.76	1	0.28
INDUSTRIAL TRAFFIC MANAGER	1	0.25	1	0.28
INDUSTRIAL DESIGNER	1	0.25	0	0.00
INSTRUMENT REPAIR TECHNICIAN	0	0.00	0	0.00
SCIENCE LAB TECHNICIAN	2	0.51	1	0.28
LIBRARIAN	1	0.25	1	0.28
LABOR RELATIONS SPECIALIST	4	1.01	1	0.28
LIBRARY TECHNICIAN	0	0.00	0	0.00

Table M22 (continued)

LAWYER	14	3.54	15	4.23
MATHEMATICIAN	0	0.00	0	0.00
PHYSICIAN	8	2.02	6	1.69
MECHANICAL ENGINEER	1	0.25	1	0.28
METEOROLOGIST	0	0.00	0	0.00
MEDICAL RECORD ADMINISTRATOR	1	0.25	1	0.28
MEDICAL LAB TECHNICIAN	6	1.52	3	0.85
MODEL	2	0.51	0	0.00
MARKET RESEARCHER	1	0.25	0	0.00
MANUFACTURER'S SALESWORKER.	3	0.76	3	0.85
MEDICAL TECHNOLOGIST.	4	1.01	4	1.13
MUSICIAN/MUSIC TEACHER..	5	1.26	4	1.13
MACHINIST.	0	0.00	0	0.00
NURSERYMAN/LANDSCAPER.	3	0.76	2	0.56
NEWSPAPER REPORTER.	6	1.52	5	1.41
OCEANOGRAPHER.	5	1.26	4	1.13
OPTICIAN.	0	0.00	0	0.00
OCCUPATIONAL THERAPIST.	2	0.51	0	0.00
PURCHASING AGENT.	2	0.51	2	0.56
POLICE OFFICER.	19	4.80	16	4.51
PUBLIC HEALTH SPECIALITST.	2	0.51	5	1.41
PILOT.	5	1.26	5	1.41
POLITICAL SCIENTIST.	1	0.25	4	1.13
PHARMACIST.	1	0.25	0	0.00
NURSE, PRACTICAL.	2	0.51	2	0.56
PHOTOGRAPHER.	5	1.26	8	2.25
PUBLIC RELATIONS WORKER.	3	0.76	2	0.56
PHYSICIST.	0	0.00	0	0.00
PHYSICAL THERAPIST.	7	1.77	5	1.41
PERSONNEL INTERVIEWER.	11	2.78	11	3.10
PRODUCTION MANAGER.	2	0.51	2	0.56
PSYCHOLOGIST.	32	8.08	31	8.73
RADIO/TV ANNOUNCER.	3	0.76	2	0.56
REHABILITATION COUNSELOR.	9	2.27	11	3.10
RECEPTIONIST.	0	0.00	0	0.00
REAL ESTATE AGENT	2	0.51	0	0.00
NURSE, REGISTERED.	5	1.26	2	0.56
RESPIRATORY THERAPIST.	1	0.25	2	0.56
RETAIL STORE MANAGER.	6	1.52	5	1.41
RADIO/TV SERVICE TECHNICIAN.	0	0.00	0	0.00
RECREATION WORKER.	4	1.01	1	0.28
SYSTEMS ANALYST	3	0.76	1	0.28
SOIL CONSERVATIONIST.	1	0.25	1	0.28
SECURITIES BROKER.	3	0.76	4	1.13
SECRETARY.	2	0.51	1	0.28
SCHOOL COUNSELOR.	13	3.28	14	3.94
STATISTICIAN.	0	0.00	0	0.00
SOCIAL SERVICE AIDE.	3	0.76	5	1.41
SPEECH PATHOLOGIST//AUDIOLOGIST.	3	0.76	4	1.13
SINGER AND SINGING TEACHER.	2	0.51	1	0.28
SURVEYOR.	0	0.00	0	0.00
SOCIAL WORKER.	11	2.78	9	2.54
TEACHER AIDE.	0	0.00	0	0.00
TELEPHONE CRAFTSWORKER.	0	0.00	0	0.00
TOOL AND DIE MAKER.	0	0.00	0	0.00
TEACHER, ELEMENTARY SCHOOL	5	1.26	2	0.56
ZOOLOGIST.	5	1.26	3	0.85
TECHNICAL WRITER.	1	0.25	0	0.00
TYPIST.	1	0.25	1	0.28
URBAN PLANNER.	1	0.25	1	0.28

Table M22 (continued)

VETERINARIAN.	4	1.01	3	0.85
WASTEWATER TREATMENT OPERATOR.	0	0.00	0	0.00
X-RAY TECHNOLOGIST.	4	1.01	4	1.13
TEACHER, ART.	0	0.00	3	0.85
TEACHER, BIOLOGY.	2	0.51	1	0.28
TEACHER, BUSINESS.	1	0.25	1	0.28
TEACHER, ENGLISH/LANG. ARTS.	1	0.25	3	0.85
TEACHER, FOREIGN LANGUAGE.	1	0.25	1	0.28
TEACHER, HISTORY/SOCIAL STUDIES.	3	0.76	5	1.41
TEACHER, INDUS. ARTS/VOC.TECH.	1	0.25	1	0.28
TEACHER, MATHEMATICS.	1	0.25	0	0.00
TEACHER, PHYSICAL EDUCATION.	2	0.51	2	0.56
TEACHER, PHYSICAL SCIENCE.	0	0.00	1	0.28
WELDER.	0	0.00	0	0.00
AEROSPACE ENGINEER.	2	0.51	1	0.28
FIREFIGHTER.	1	0.25	2	0.56
KEYPUNCH OPERATOR.	0	0.00	1	0.28
LANDSCAPE ARCHITECT.	1	0.25	2	0.56
OPERATING ROOM TECHNICIAN.	1	0.25	2	0.56
OPTOMETRIST.	2	0.51	2	0.56
TEACHER, EARLY CHILDHOOD.	4	1.01	7	1.97
TEACHER, SPECIAL EDUCATION.	2	0.51	4	1.13
CONSTRUCTION INSPECTOR.	2	0.51	3	0.85
CORRECTION OFFICER.	2	0.51	2	0.56
GEOLOGIST.	0	0.00	0	0.00
HOSPITAL ADMINISTRATOR.	2	0.51	1	0.28
PHYSICIAN'S ASSISTANT.	3	0.76	4	1.13
STENOGRAPHER.	0	0.00	0	0.00
EEG TECHNOLOGIST.	0	0.00	0	0.00
NURSING ASSISTANT.	1	0.25	1	0.28
FLORIST (RETAIL & DESIGNER).	0	0.00	0	0.00
TEACHER, VOCATIONAL/TECHNICAL.	0	0.00	0	0.00
CHEF/COOK.	0	0.00	0	0.00
PLUMBER.	0	0.00	0	0.00
FOOD SCIENTIST/TECHNOLOGIST.	0	0.00	0	0.00
TELEVISION PRODUCER/DIRECTOR.	1	0.25	1	0.28
INTERPRETER/TRANSLATOR.	0	0.00	0	0.00
LEGAL ASSISTANT.	1	0.25	0	0.00
FARMER/FARM MANAGER.	0	0.00	0	0.00

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[a] "Pre" (first two columns) means first choice before the student received information about the rewards and risks associated with the occupation.

[b] "Post" (third and fourth columns) means first choice after receiving information about rewards and risks.

Table M23

Designation of First-Choice Occupations in Strategy with Respect to Desirability Sums and Estimated Chances for Entry

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DESIRABILITY OUTCOME (N = 384)	FREQ	%
OCCUPATION WITH THE HIGHEST SUM.	141	36.72
WITHIN 10 POINTS OF THE HIGHEST.	80	20.83
MORE THAN 10 POINTS BELOW HIGHEST.	163	42.45

WHICH STRATEGY (N = 357)	FREQ	%
SUM HIGH;[a] CHANCES HIGH.	124	34.73
SUM HIGH;[a] CHANCES LOW.[b]	79	22.13
SUM LOW;[c] CHANCES HIGH.	87	24.37
SUM LOW;[c] CHANCES LOW.[b]	27	7.56
SUM HIGH; CHANCES EQUAL.	35	9.80
SUM LOW;[c] CHANCES EQUAL.	5	1.40

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[a] Sum High means that the occupation had the highest Desirability Sum or came within 10 points of the highest sum.

[b] Chances Low means "chances not high"; i.e., the student estimated better chances for some other occupation in the set of three. Low does not necessarily mean lowest.

[c] Sum Low means that the Desirability Sum was not the highest or within 10 points of the highest. It does not mean that the Desirability Sum was necessarily the lowest of the three sums under consideration.

CHAPTER XI

SUMMARY AND DISCUSSION OF FINDINGS ACROSS COLLEGES

Technical Aspects of the System

Hardware

At the time this report was written, SIGI was available only on the Digital Equipment Corporation (DEC) PDP-11 series of computers under the RSTS (Resource-Sharing TimeSharing) operating system. Since RSTS is a general purpose time-sharing operating system that can support a large number of simultaneous activities in addition to SIGI, the actual hardware configurations at the six field-test colleges varied in accordance with the functions that the computer systems were designed to perform at each college. At some, the hardware was dedicated to SIGI, and at others it was put to numerous additional uses. The configuration at each college is described in the chapter devoted to the college.

Appendix F, the SIGI Hardware Guide, lists the hardware specifications, together with costs, of a basic four-terminal system and a sixteen-terminal system. The Guide specifies DEC VT52-AE terminals and LA35-CE DEC writer II printers. All the terminals used in the field tests were Delta Data 5000's, and the printers were Texas Instrument 30-character-per-second units. Manufacture of the Delta Data terminals is being phased out, and SIGI has consequently been reprogrammed to drive the VT52's as well as the Delta Datas. The change of printer was necessitated by the change of terminal. Except, then, for terminals, printers, and the interfaces between the two, the hardware described in the Guide is the basic hardware used by the test colleges, and our evaluation of it applies to what is listed in the Guide.

Reliability. From the colleges' records of hardware performance during the three-month test period, we found no malfunctions due to SIGI. When malfunctions occurred, they were due to the normal operation of the computer system. They were completely independent of SIGI.

The hardware is all standard equipment and requires no modification to operate SIGI. This is an important consideration for anyone contemplating buying the hardware for SIGI. It means not only that the costs and risks of unique modifications can be avoided, but also that the hardware can be judged independently of SIGI. One can call on the whole population of PDP-11 users, not just SIGI users, in making judgments about the hardware's reliability.

Although no VT52 terminals or DEC writer printers were used in the field trials, the foregoing statements apply to these components, too. They are standard equipment which may be used without modification for SIGI and may be judged independently of it.

Costs. The SIGI Hardware Guide lists the hardware and maintenance costs of dedicated four-terminal and 16-terminal systems. If the assumptions set forth on pages 6 and 7 of the Guide are met--12 hours' operation per day for 225 days per year--the cost per terminal hour would be $1.73 for the four-terminal system and $0.90 for the sixteen-terminal one. Over five years, 13,500 students would use SIGI on the four-terminal system, and the equipment costs would be $6.92 per student. Since the assumptions are conservative, when compared with actual use at the field-test sites, these costs can be taken as upper bounds--particularly since the trend in hardware prices has been downward.

Software: Time-Sharing Capability

The decision to program SIGI in extended BASIC (BASIC-PLUS), one of the programming languages that can be used under RSTS, turned out well. The actual programming was undertaken by Evans, Griffiths, and Hart, Inc. (Lexington, Massachusetts), and proceeded rapidly and smoothly. It was completed by the time the first field-test college got delivery of its hardware, and colleges that had ordered more than one terminal could begin operating in the time-sharing mode as soon as they started up.

The program appears to be entirely free of bugs. No outages have occurred at any college because of the SIGI software. Response time is excellent with no noticeable delays. We do not know the extent to which the system can be loaded before degradation of response time sets in. Santa Fe, which started with four terminals and has added a fifth since the field test, was the only college with enough terminals to provide an evaluation of a multi-terminal system. Response time was fully acceptable at that college under all loads. At ETS we have used six terminals simultaneously and loaded the system with other peripherals, such as teletypes and line printers, without perceptible degradation. SIGI is programmed so that it has priority over other computer tasks and the response time is excellent even when other activities are competing for time on the computer system.

Software: Design

The software design--that is, the linkages between the systems so that SIGI can serve both as a guidance tool and an information system, the operating procedures, the storage of value weights and occupations of interest, and so on--seemed entirely adequate. There are a few minor changes we wish to make so that SIGI will be even more acceptable to its users (see below); but there is only one feature of system design that will become necessary for technical reasons.

As occupations are added to SIGI, it seems likely that more and more of them may be similar with respect to certain combinations of values/specifications. For example, the secondary school teaching occupations can all be retrieved together in Locate if one makes the proper specifications for the proper values. At present, if more than 20 occupations are retrieved at a time, the student is forced to make his specifications more strict in order to reduce the size of the list. We wish to increase this number from 20 to 40 so that a condition will not occur where the student is told to raise a specification because his list is too large, does so, and finds that no occupations are retrieved at all.

Software: Test-Free Prediction System

The development of a prediction system that would be independent of test scores was successful. In the next chapter we will cite studies that we have completed showing that the predictions we have obtained using the test-free variables described earlier attain levels of validity comparable to and sometimes superior to those attained with test scores. This is an important outcome of the field tests aside from the evaluation of SIGI.

The ability to render predictions without resorting to tests offers an institution several advantages. First, a test-free program can give open-admission colleges and colleges that have no mandatory testing the opportunity to provide useful information to their students, the absence of tests notwithstanding. The nontest approach is particularly relevant to course selection for career decision-making, since it focuses on the single key course of interest rather than on general academic ability.

Second, since the test-free predictions depend on up-to-date predictor variables rather than on tests that may have been taken in the more or less remote past, the validities are not likely to be subject to decay.

Third, since the student-users themselves provide the information for the predictions, students are not likely to regard them as biased; the results are likely to be more acceptable to students than are test scores.

Fourth, we have grounds for hoping that the test-free approach may enable us to make predictions for courses that are hard to predict by means of standardized tests because success does not appear to draw primarily on academic skills. An example from one of our studies is a course called

Visual Arts, for which we obtained much higher validities without tests than with them. The grade factors and student's estimate of grade, which may be used as predictor variables in the test-free system, can be tailored to the actual content of the course.

Finally, the nontest techniques may produce educational benefits for both students and faculty that tests cannot provide. Students become active rather than passive participants in the process, since they must examine their past and take stock of their competencies. Faculty benefit because, in selecting grade factors, they have to think about and make explicit their bases for awarding grades. In addition, when the information resulting from the validity studies is fed back to them and they see the actual correlations between the factors they thought contributed to grades and the grades themselves, they can re-evaluate and modify their grading practices.

Adequacy of Courseware

By the locution adequacy of courseware we mean other aspects of SIGI than its effectiveness in producing favorable changes in students' attitudes and behavior with respect to career choice. Are students able to retrieve occupations they are interested in? Can they operate the system without outside assistance? Do they accept the idea of interacting with a computer? Is the reading level acceptable? And so on.

Retrieval of Occupations of Interest

One principle underlying SIGI is that the students' own values may be used in the search for occupations. Does this principle work in practice?

Question 66 on the questionnaire given to experimental students asked whether occupations of interest had shown up on the list determined by the students' values. At one college 67% of the students replied yes, and at the other five colleges from 73% to 79% replied yes. If we pool the responses, the percentage of yes responses is 74. This high proportion indicates not only that the retrieval principle works successfully but also that the occupations in SIGI include those that students are most likely to be interested in.

Student Ability to Interact with SIGI

Ability to operate the system. Students occasionally asked the SIGI monitors for help in making responses to one display or another. We did not keep a formal tabulation of such instances; they were rare. The monitors and coordinators identified trouble spots for us when they occurred, and we were often able to edit displays in order to remove ambiguities without reprogramming.

Most students were able to go through SIGI without any outside intervention. Short of a computer malfunction, it is almost impossible for students to get stuck. The computer will not accept responses that are invalid in the context of the display, so that even if students were pushing buttons at random, they would eventually make a response that would allow the computer to continue.

We should add that, when we interviewed students whose record of interaction we had, we were struck by how often behavior that appeared irrational or random in the record was actually rational and constructive. For example, one student retrieved only one occupation on one occasion in Locate. He then *raised* a specification--not once, but twice--and retrieved the same occupation each time. This behavior seems irrational, since it cannot possibly cause the appearance of new occupations. The student, however, knew what he was doing: He was testing the limits for that occupation.

The interviews with students and SIGI monitors uncovered many such instances of interesting and sometimes creative uses of the system. Students will formulate ideas about occupations not in SIGI by asking about related occupations in SIGI; sometimes they test the system; they occasionally ask questions for friends; they play games; they dream impossible dreams. Of course, not all behavior that appears irrational turns out to be the opposite. But much of it turns out to be rational and even imaginative.

Ability to comprehend the system. Counselors, monitors, and students who were interviewed have all helped us identify the areas of SIGI that seem hardest for students to understand. These are, system by system:

1. Values system. A few students did not understand the definitions of the values exactly as intended. One identified Security as a characteristic of a job rather than an occupation and consequently failed to give it the weight it deserved. Other students failed to understand distinctions between the six interest fields.

2. Locate system. There was an evident tendency on the part of some students to think of Locate in prescriptive terms rather than descriptive. In their interviews, they would use expressions like "SIGI told me to be a pilot," or, "SIGI said I should be a funeral director." (Writers of articles about SIGI have done the same thing even though they have been cautioned against it.) Also, some students failed to understand the options that were available to them in Locate; they did not ask why occupations of interest failed to appear, or experiment with various sets of values/specifications. In addition, a few students resented having to raise a specification when too many occupations were retrieved or lower a specification if none had been retrieved; they thought that doing so would compromise their values in some way.

3. Prediction system. Some students were puzzled by the prediction process. They did not understand the basis for the predictions. If the predictions were interpreted as being unfavorable, some students tended to disregard them. Some also thought that high motivation would overcome all obstacles.

4. Strategy system. A few students did not understand how Desirability Sums were computed, although we are not aware of any instances where students failed to grasp that a higher sum indicates a more desirable occupation in terms of the SIGI values.

Students' suggestions for technical changes. Students volunteered suggestions for programming changes that would make the interaction easier.

1. Backspace. Students sometimes wanted to go back to a previous display either to change a response or to review information. Adding this feature is not feasible, however, for technical reasons. Many SIGI frames are constructed on the spot and never existed before they were displayed. These frames would have to be stored after the student had responded to them on the chance that the student would "backspace" to them. Such storage would unduly increase the complexity and the cost of the system.

2. Forced printouts. Students are required to accept printouts of some displays even if they think they do not want them. A group of counselors had particularly urged us to incorporate this feature. However, students dislike the attendant delay while they wait for the printer to finish. Our experience in the field tests indicates that forcing students to take printouts is not advantageous, and all printouts will be made optional in the next revision.

3. Corrections of inputs. Students have occasionally wanted to change one of their responses but have been unable to do so. We think this is not a serious problem. Students already have the opportunity to change some inputs--the identification numbers of occupations, and questions asked in Compare, as well as their estimated chances of success in Strategy--and they can change other inputs by recycling through a system. Nevertheless, we expect to study this matter further.

4. Midsystem sign off. A few students, under time pressure, would have liked to sign off without finishing a system. This seems to be a question of procedure to be worked out by the colleges. Students may "sign off" by walking away from the terminal, or the monitor may abort the interaction in midsystem. There will be no loss to the student as a result of such "sign offs." Novices will be restarted at the beginning of the system they were in when they departed, and initiates can restart in any system.

5. Tedious stretches. Some students reported that the interaction occasionally dragged on after they had got the point. One such sequence explains the derivation of Desirability Sums by showing how the Logic family determines the desirability of three automobiles they are thinking of buying. Another uses the analogy of an archer shooting at a target to show that predictions are based upon past experience. We would like to reprogram these portions of the script to make them go faster if we can find financial support to do so.

6. Increasing number of occupations retrieved. Some students would like to see all the occupations retrieved in Locate for a given set of value/specificiations, even if their number is more than 20. We hope to revise the retrieval process so that up to 40 may be retrieved before the student is forced to alter a specification.

7. Improving method of selecting occupations. The selection of occupations for Compare, Planning, and Strategy is done in two stages. In the first stage, the student signifies whether or not he wishes to select an occupation from the list of occupations previously retrieved or selected. We expect to eliminate that step in order to simplify the procedure.

Adequacy of Occupational Information

Quality of information. Question 68 of the experimental questionnaire (Table College-Initial 5) and question 33 of the counselor questionnaire (Table College-Initial 8) asked respondents whether the occupational information in SIGI was better than, the same as, or worse than occupational information the respondent had encountered elsewhere. The pattern of responses was very supportive of SIGI. At five of the colleges, 73-76% of the students checked "better," and 21-27% checked "same;" only 3% at one college checked "worse." At the sixth college, the score was 62% "better," 32% "same," and 5% "worse." If we pool the information across all colleges (n = 374), the score is 73% "better," 26% "same," and 1% "worse."

The reactions of the counselors was similarly supportive. No counselor at any college checked the "worse" column. The ratios of "better" to "same" ranged from a low of 3 to 3 at one college to a high of 10 to 1 at another. The pooled responses showed 38 counselors responding "better," 13 "same," and none "worse."

Information from interviews at the college bear out these results. When students talked at all about the occupational information, they talked about how useful it was and how easy to access. Some students, who had a more or less definite occupational goal, thought the information was too skimpy for a thorough study of an occupation. (SIGI was not designed for this purpose.) A few others complained that the information was too old. This criticism probably comes about because we date all salary information so that the student may intelligently compare figures compiled in different years. Any date we could put down would probably look "old" to the student because it takes at least a year and usually more for an organization to survey an industry and provide the findings. A student would be hard to put to find published information more recent than that in SIGI.

Adequacy of coverage. Question 69 on the experimental questionnaire (Table College-Initial 5) asked students whether they wished they could ask other questions about occupations besides the 28 questions in SIGI. Again, the pattern of responses was quite similar at all colleges, ranging from a yes/no ratio of 7 to 93 at the most satisfied college to 16 to 84 at the least satisfied college. If the data are pooled, they reveal that 87% of the students (n = 369) thought that the 28 questions covered their needs adequately.

Students were asked to suggest additional questions. The suggestions are listed in Table College-Initial 6 for each college. It is difficult to find among the suggestions a common theme that would guide us in adding new information or changing our presentation of what we have. When one has eliminated from the lists those questions that neither man nor machine could answer (e.g., "In what position will I be happy?") and questions that are, indeed, answered in SIGI (e.g., "Financial aid information," "High school prerequisites," both covered in the Planning system), one finds a group of suggestions to make local information available, a group to supply more explicit information about outlook, and some miscellaneous suggestions. We would like to incorporate in SIGI a little program that would enable a college to add local information when it is available; it could include statements about local employment prospects. We would also like to provide more explicit information about how many jobs will open up in an occupation five years from now or even next year, but our system hardware does not include a high-resolution crystal ball.

Size of the occupational base. Question 30 of both the control and experimental questionnaires asked students, "What occupation would you most like to prepare yourself for eventually?" Tables College-Initial 2 and 3 list the replies with the occupations sorted into three categories: those that were in SIGI, those that were not, and those that were too vague to classify.

If we exclude the occupations that were too vague to classify, we find that 300 (90%) of the experimental students who named classifiable occupations at the six colleges named occupations that were in SIGI, while 35 (10%)

named occupations that were not in SIGI. If we combine experimentals and controls, we find that 697 students (87.5%) who named recognizable occupations named occupations in SIGI, whereas 100 (12.5%) named other occupations. The colleges were quite similar in this respect; the percentage of occupations in SIGI (again, excluding those too vague to classify) ranged from a low of 84% at one college to a high of 92% at another for the experimental students, and from 80% to 91% for the controls. Apparently, the 155 occupational descriptions in SIGI are sufficient to meet the needs of about 90% of students who are able to specify the occupation that they are most interested in.

Student Acceptance of SIGI

Grades assigned to SIGI. Questions 42-44 of the questionnaire for experimentals asked students to give SIGI a grade (A to F) on how interesting, clear, and generally "good" it was. Questions 45-54 asked for grades on the usefulness of SIGI with respect to specific aspects of career decision-making, such as helping them understand their values, make predictions, and so on. The results at each college are recorded in Table College-Initial 5 of the chapter devoted to the college. The responses are a measure of how acceptable interaction with SIGI was to these users.

The pattern of responses at all the colleges was strikingly similar with regard to most of the questions. If, for instance, one looks at the modal grade at all colleges it is A or B for every question except the following: On question 50, "Helping you understand grade predictions expressed in probabilities," the modal response was B for three colleges and C for the remaining three; on question 51, "Helping you estimate probabilities of success in one or more programs ," the modal grade was C at one college and B at the rest; and for question 52, "Giving information about programs of study at your school," the modal grade was A at two colleges, B at two others, and C at the remaining two.

Since the colleges were so similar in their attitudes toward SIGI, we pooled the responses to questions 42-54. The results appear in Table 2. They show that student acceptance of SIGI was very good. Eighty-six per cent graded it A or B on how interesting it was (question 42), 90% on how clear it was (question 43),and 87% on its overall "goodness" (question 44).

Insert Table 2 about here

Question 45 asks how helpful SIGI was in enabling students to decide on an occupation to prepare for. The fact that the percentage of A and B responses decreased to 61 on this question is not unexpected. Many students leave SIGI without having yet reached commitment to an occupation. The phrasing of the question invites a smaller proportion of higher grades.

Eighty-five percent gave SIGI a grade of A or B on its helpfulness in making them better aware of their values (questions 46 and 47). Seventy-nine percent gave it A or B on its helpfulness in finding occupations that fit their values--i.e., the Locate function (question 48). And 85% graded it A or B on helping them find occupational information (question 49).

Grades were considerably lower on the Prediction and Planning aspects of SIGI (in part, because a substantial number of students had not yet reached those sections when they filled out the questionnaire); 59% gave a grade of A or B on question 50, and 62% on question 51, both of which asked about satisfaction with the prediction process. And 58% gave SIGI A or B on its information about local programs of study (question 52). We may note also a larger degree of dissatisfaction on this question, for 12% of the students assigned a grade of D. This was also the question on which the colleges exhibited the greatest variability as described above. We note in addition that question

53, which asked how helpful SIGI had been in enabling the student to plan an appropriate program, also received relatively fewer A's and B's--64%. The lower grades assigned to the Planning system in questions 52 and 53 seem in conflict with responses to another question on the questionnaire. Question 81 asked students who said they wanted to come back to SIGI which systems they most wanted to use. The Planning system ranked first at three colleges and second at two others. Even though grades for the Prediction and Planning systems were lower than grades for other systems, acceptance was still high; the proportion of A's and B's hovered around the 60% mark.

Question 54 asked how helpful SIGI had been in teaching how to make career decisions. Seventy-three percent of the students graded SIGI A or B on this aspect, which is most nearly related to the Strategy system.

Reading level. Question 70 of the questionnaire for experimental students asked whether the style and vocabulary of SIGI were too hard, just right, or too simple. The responses were similar at all colleges. In five out of six, 90% or more of the students checked "just right," and at the sixth college 88% checked that answer. Never did more than 4% of the students find the reading level too difficult, and at three of the colleges no one did. If we pool the responses, we find that 2% checked "Too difficult," 92% checked "Just right," and 7% checked "Too simple." (The total is 101% because of rounding errors. The n is 376.)

Counselors were also asked whether the SIGI writing style was appropriate for their students (question 32 of the counselors' questionnaire). Forty-three counselors replied yes and two (one at each of two colleges) replied no. One of these noted that deaf students have had reading difficulties with SIGI, and the other noted that international students have had difficulty interpreting idioms.

Apparently, the reading level of SIGI is appropriate for the population for which it was designed.

Freedom from bias. Question 71 asked students whether they detected any sexual, racial, or other bias in SIGI. The answers ranged from 95% no at one college to 100% no at another. Pooled data (n = 374) indicate 98% no across all six colleges. The percentage of no responses should actually be even higher, since some of the students who checked the yes column indicated, in the verbal portion of their response, a bias on their own part or a misapprehension of what the question asked for. (See the Tables College-Initial 6, question 71.) In response to question 34 of the counselor questionnaire, 45 (92%) of 49 counselors indicated that they thought SIGI was free from bias.

These data should be considered in light of how well the ethnic, racial, and sexual composition of the sample reflected the composition of the student population at the colleges. We know that more women than men were in the sample. We have no identification of users by race or ethnicity. We asked the colleges to select the experimentals randomly from the total body of SIGI users; the use of SIGI was not restricted in any way that would make SIGI users unrepresentative of the student population. Consequently, we believe that the sample contained about the same proportion of minority members as the student population as a whole. Considering that community colleges typically attract sizable numbers of minority students, we think that the evidence for SIGI's being free of bias is convincing.

Perception of problems. There was not great consistency in the way students at the various colleges responded to question 72, which asked them to check, on a list of nine problems, the ones they had encountered in their interaction. Most uniformity occurred with respect to the first item, "I did not understand some of the directions": The frequency with which this item was checked ranged from a low of 9% to a high of 14%. There was considerable variation in responses to other questions. No single item stands out as a problem at all colleges.

One can detect in the pattern of responses the disadvantages of operating with a single-terminal system. Having to wait too long for an appointment (item 3) was checked by 20% of respondents at a college with only one terminal, and by 10% at two other single-terminal colleges. The percentages were lower for colleges with multiple terminals. Fewer than 10% of the respondents at the colleges with multiple-terminal systems felt rushed (item 5). At the single-terminal colleges the percentages ranged from 13 to 29. (The latter figure came about because students at the college were required to use SIGI for a credit course and had to crowd through the last three systems as the end-of-term deadline approached.)

We would, of course, like to reduce the "problems" to zero. Problems 3 and 5 (difficulty in securing an appointment and the feeling of being rushed) seemed related to a lack of terminals; presumably, these problems disappear as more terminals are added. Problems 6 and 7 (computer failure and jumbled writing) are due to hardware malfunction and are independent of SIGI. Problem number 8, inability to sign off in midsession, is more apparent than real, since the student can leave if he wants to. The remaining problems are 1, 2, 4, and 9--understanding of directions, eye fatigue, too much reading, and the miscellany of "other" problems. We are studying these problems in the hope of reducing their occurrence still further.

Acceptance of the printout feature. Students apparently welcome the opportunity to obtain printouts. Question 73 asked students how often they asked for printouts. The pattern of responses was the same at all colleges. Pooled data (n = 382) show that 75% asked for printouts frequently, 22% sometimes, 2% once or twice, and only 1% never.

Desire for further use. One indication of acceptance of SIGI was the fact that a majority of students wanted to use it some more even though most of them had been through it once. The proportion of yes responses to question 79, "Do you think you would profit from further use of SIGI?" ranged from a low of 53% to a high of 73%. The pooled data (n = 380) show 62% yes and 38% no. These data support a conclusion we make from our interviews with SIGI users, namely, that many students do not discover a definite occupational goal as a result of a few hours on the computer. However they seem to think that SIGI was useful in their search, for they would continue to use it.

Features liked best. Question 84 asked students what they liked best about SIGI. The pattern of responses was again similar at all colleges, with a clear preference for Values, Locate, and Compare; a small preference for Prediction, somewhat larger for Planning, and smaller again for Strategy. Some 6% to 10% of responses also favored item 7, "Learning how values affect decisions." The results call for several comments.

1. Every system was named as best by some students.

2. The Values system received the greatest proportion of votes at two colleges, the Locate system at three colleges, and the Compare system at one college. If we pool the data (n = 514), we find that these three systems were regarded as best by, respectively, 24%, 25%, and 23% of the respondents. That is, these three systems received nearly three-quarters of the votes for best. By comparison, the Prediction, Planning, and Strategy systems received 2%, 9%, and 5% of the votes. Category 7, "Learning how values affect decisions," received 10% of the votes, and "Other" got the remaining 3%. This decided preference for the "front end" of SIGI suggests that students favor the part of SIGI that, in their eyes, meets their immediate needs. (It may also reflect,

in part, the fact that some experimentals had not yet reached the remaining sections.) The immediate need for most students is to choose an occupational goal, and the Values, Locate, and Compare systems are the best instruments for doing that. On the other hand, Prediction, Planning, and Strategy are most useful for "sizing up" a preselected occupation rather than for picking one out. (The Compare system serves both functions.) It is interesting to note that when students want to return to SIGI, they tend to designate the Compare and Planning systems, not Values and Locate, as the ones they most want to use (question 81). Presumably, their need to choose an occupational goal would have been reduced in their first pass through SIGI, and their need upon their return would be to "size up."

3. Roughly 10% of the respondents checked category 7, "learning how values affect decisions." The low was 7% at one college, and the high was 14% at another with respect to this response. Apparently, sizable numbers of students find this fundamental principle the best aspect of SIGI.

Passing the word. Finally, we asked students, as an indication of acceptance of SIGI, whether they had advised their friends at their college to use SIGI (question 86). At two colleges the percentage of yes responses was in the 60's, and at the other four it was in the 70's. Pooling the data (n = 382) shows 71% of the SIGI users reporting the behavior described in the question.

Recommended Revisions

These findings suggest a high level of acceptance of SIGI. Major revision does not seem necessary or desirable. Nevertheless, if funding permits, we would like to make some revisions to take into account what we have learned in the field test.

Expansion of occupational base. Even though the occupations already in SIGI meet the expectations of almost 90% of the SIGI users, our intention to increase the number of occupations as rapidly as possible continues. In doing this, we would be attentive to the occupations suggested by students and counselors on the questionnaires, as well as the occupations identified in our surveys as described earlier. We also believe we should divide some occupations already in SIGI, such as Psychologist, into their specialties.

Local information. We would like to provide a method by which a local college could add local information about the occupations in SIGI. Adding this feature would require restructuring the SIGI files and devising some way to protect them from contamination, and therefore it is not trivial. The main problem, however, is not with SIGI but with the colleges' ability to get reliable information and keep it up to date. We wish to explore this matter further.

Technical changes in the script. Some technical changes were mentioned earlier in this chapter. They were (a) making all printouts optional; (b) increasing from 20 to 40 the number of occupations that can be retrieved at one time in Locate; and (c) improving the method of selecting occupations for Compare, Planning, and Strategy.

Other changes in the script. There are other script changes that seem desirable in light of student comments.

1. Locate. Although Locate was, by a small margin, the best-liked system (question 84), in intereviews students sometimes indicated that they did not know how to use it to best advantage. We would like to reprogram parts of the sequence so that novices would be required to use each feature once to insure full awareness of the capabilities of Locate.

2. Prediction/Planning. We contemplate a revision that would tie these two systems more closely together and permit shuttling back and forth even for novices. Students in the Prediction system could access the Planning system to find out which program their college recommended as preparation for

a particular occupation. They could then ask for a prediction for that program. In the Planning system, students could be transferred to the Prediction system when they were assessing their ability to prepare successfully for an occupation.

3. Explanatory sections in Prediction and Strategy. The explanations that answer the five questions in Prediction and that describe the derivation of Desirability Sums in Strategy are at present straight linear sequences that all students must follow. We wish to change these sections so that explanations occur at three levels. The first would be a summary explanation that all students would see. Those who "got" it could go on, and others could ask for a more detailed explanation consisting of several frames. Beneath this second level, a third and yet more detailed level would exist for students who needed it. These levels would speed up the progress and reduce the reading load for many students.

Implementation of College-Specific Sections

We hoped that the operation of SIGI would be so simple that the colleges would be able to operate a dedicated system without the need for specially trained personnel. Also, we wished to make our Prediction and Planning system manuals clear and detailed enough that the colleges could collect the necessary data and construct the necessary displays without the need for expert assistance. Were these hopes realized?

Operation and Manager's Guide

Appendix E, the SIGI Manager's Guide, was the instrument for assisting the colleges in operating SIGI. It contains instructions for installing the SIGI disks, making back-up copies, starting up and shutting down the system, assigning student numbers, deleting obsolete information, sweeping the disks of data collected in this evaluation, and so on. Our hardware specialists at ETS backed up the manual by making themselves available for consultation by telephone. They also installed the SIGI software at each college when it started up and occasionally visited the sites.

There was large variation among the colleges in the extent to which the technical management of SIGI was conducted by computer specialists. At one college with a large computer that was used for many services besides SIGI, hardware management was entirely controlled by technical personnel. At another college with a basic system dedicated to SIGI, the hardware was physically and administratively kept out of the technicians' grasp, and SIGI was operated by a counselor who had never used a computer before. Between these extremes were different levels of sophistication. Some colleges had a member of the staff take a short training course in the operation of the hardware.

The best test of the SIGI Manager's Guide and our procedure for communication was the college where SIGI was controlled entirely by a technically unsophisticated person. This person was able to handle all of the technical aspects of daily operation by himself. Questions that were not answered in the Guide were resolved through telephone calls to the ETS technical staff. Unusual activities were more difficult for him to cope with. These were the data collection sweeps, which are not a normal part of the SIGI operation but were required of the field-test colleges, and the installation of additional terminals, which required more knowledge of hardware than his limited experience had mastered. Problems in these areas did not occur at other colleges with personnel specially trained in the operation of the hardware.

It is apparent from this experience that our manuals and procedures for the day-to-day operation of SIGI work even with unsophisticated personnel. The system managers seem able to pick up enough skill to operate the system.

Week-long training sessions are also available from the hardware manufacturer. It is not necessary to employ computer specialists. However, consultation with ETS staff has been necessary when unusual conditions arose or when hardware was to be expanded or changed.

Prediction System Development

The first three colleges to get their hardware were the first to develop their Prediction systems. Our experience with them allowed us to refine and simplify our procedures for collecting the data for that system. The greatest simplification came about when we compiled the list of 29 grade factors from which instructors select two for each key course. The first colleges had made up their own grade factors. So many of the factors appeared again and again that we were able to generalize the wording and make up the list that appears in Appendix A. We were also able to refine the Prediction System Manual and to make our directions more clear.

The result has been that each college has been able to collect the necessary data. Each of the colleges has an operating Prediction system. Data collection is continuing at some colleges for courses where enrollment for any single term is small and where the first wave of data collection did not result in sufficiently high multiple R's to meet our minimum standard of .40.

Our procedures are still being refined. We have prepared computer programs that facilitate our handling of data at ETS, and we continually make minor revisions in the Prediction System Manual. Data collection at the last three colleges went much more smoothly than at the first three.

Planning System Development

The six colleges were also able to follow successfully our procedures for constructing their unique Planning systems. Each college has an operating system.

As was true of the Prediction system, we were able to build on our experience with the first college in order to improve our methods with respect to the later ones. The main vehicle for implementation of the system is the Planning System Manual, which is Appendix C of this report. We have made small changes in the text of the manual and more extensive changes in the way that we present the occupational information that the college uses in preparing its displays (Appendix A of the Manual; see also Figure 12 in Chapter III). As more and more colleges prepare their Planning systems, we will be able to add their judgments about the appropriate preparation for each occupation.

Our experience in communicating with the colleges as they prepared their systems has also enabled us to improve our procedures. We now ask the college to send us the first half dozen or so displays they prepare. Our review of them provides feedback for the preparation of the rest of the displays. The preparation of the Planning system at the last college went quickly and smoothly.

At all colleges the preparation was done by persons without special training in either computer information systems or occupational information. The work has been done by paraprofessionals and graduate students working with a regular counselor, and by counselors themselves. Extensive consultation with the SIGI staff was not required. All the systems run smoothly and, in our judgment, are of high quality.

Feedback to the Colleges

Preparation of Prediction and Planning systems has provided some of the colleges with useful feedback quite apart from SIGI. We have been able to tell colleges of changes in the distribution of grades in a key course. We have also shown them the zero-order correlations between the grade factors selected by faculty and the actual grades themselves. Often the correlation is small and occasionally even negative. This information can help instructors examine their grading practices. At one college a key course, English, proved unpredictable because none of the grade factors selected by the instructors correlated well with final grades. This information resulted in a review of the departmental policies with respect to grades.

The preparation of the Planning system has also proved salubrious on occasion. At one college extensive revision of some curricula was undertaken. Preparation of the displays had revealed that courses varied from instructor to instructor and that some courses did not actually prepare the student for the occupation that the curriculum was designed for.

Usage of the System

The summary data collected by the computer were presented in the chapters devoted to the individual colleges, Tables College-Initial 10-23. What do these data tell us about the operation of SIGI? There are rich deposits of sociological information in these tables, but in this section we are interested only in the evaluation of SIGI.

Breakdown of Samples

There was considerable variation at the colleges with respect to age, sex, and enrollment status (Tables College-Initial 10). At one college, about 57% were 25 years old or older, and 12% were 18 or under. At another, only 9% were 25 or older and 50% were 18 or under. The other colleges ranged between these extremes.

There was also variation with respect to sex. The ratio of women to men ranged from 61%:39% at one college to almost 50%:50% at another. Women outnumbered men at all colleges.

There was also variation in enrollment status. At one college 41% of the students declared their enrollment status as "Other," and only 8% as "About to enter." For four out of the six colleges, the modal response was "Completed 1 or more semesters," at one it was "First semester or quarter," and at one it was "Other."

We see from these data that, across all the colleges, the students who used SIGI were quite varied. Students of different ages and enrollment statuses and of both sexes use SIGI.

Initial Status with Respect to Career Decisions

The students at the six colleges were quite similar in their responses to questions about the status of their career decisions (Tables College-Initial 11). In all cases fewer than one-quarter of the students indicated that they were in the dark about their values or would know their values only if they saw them. The modal response was 2, "General idea of what I want," where the percentage of responses ranged from 47 to 64. It is interesting to note that at every college more students admitted they were completely in the dark than said they would know their values if they saw them. The number of students completely in the dark was not small: 12% at one college up to 16% at another.

The status with respect to occupations indicates that most students start SIGI without clearly defined occupational goals. At all six colleges 50% or more of the responses to the question about occupation status were "I need lots of information." The next most frequent response was "Not sure they [contemplated occupations] fit my values." Fewer than a third of the students at any college could list one, two, or three occupations that fitted their values.

The status with regard to prediction was somewhat better, 70% or more of the students responding that they could successfully predict their grades for some or any program. But the status of planning was not so good. At five of the colleges, the percentages responding "Don't know which program to take" ranged from 37% to 49%, with fewer than 18% of the students indicating that they knew which program to enroll in. At the sixth college, which had a larger proportion of older students, about 22% indicated they knew which program to take and 37% had no idea about programs.

The message delivered by the Tables College-Initial 11 is that students tend to be indefinite about their occupational goals and they enter college with little idea about which program to take. They need information and guidance.

Values System

Values weights. The pattern of values weights was generally similar at all colleges, but with some interesting exceptions (Tables College-Initial 12). Interest Field was the top-weighted value in the Restricted, or final weighting, at five of the six colleges and at the sixth it ranked second. Income ranked first at this college, second at four colleges, and fourth at the four-year institution. Security also tended to rank high. At the four-year college, the order was Interest Field, Helping Others, Variety, Income, and Security.

In all cases, Early Entry and Prestige were ranked lowest, with Leisure or Leadership ranked next lowest. The low weight assigned to Early Entry is understandable, since all the students had already committed themselves to college to some degree.

The tables indicate that all ten of the SIGI values were important to some students. There was no serious ceiling or floor effect, since even the highest and lowest weighted values exhibited sizable variation. In reducing the sum of their weights to 40, students were selective; not all values were reduced proportionately, and we may infer that students were giving thought to the reducing process, not simply following some mechanical algorithm. Also, at every college, there were differences in the rank ordering of the Unrestricted and Restricted columns. We infer that such differences were due to the effects of the Values Game, which was played after the unrestricted weights were assigned and before the reduction.

We have noted that at the four-year college the four top-ranked values were Interest Field, Helping Others, Variety, and Income, whereas at all the other colleges they were Interest Field, Income, and Security or Independence (not always in exactly that order). The four-year college was also the college where the proportion of women students was 60%. We do not know whether the appearance of Helping Others and Variety among the "top four" is due to institutional or sex differences or something else. We are currently doing a study to determine whether sex and age differences affect value weights.

Interest Field selection. The most striking feature in the tables showing the Interest Field selections (Table College-Initial 13) is the popularity of the Personal Contact field. It ranked first by a wide margin at every college. Another noteworthy feature is the lack of interest in the Technological field even though five of the six institutions are community colleges with strong curricula in the technological area. The Aesthetic field also ranked low at all colleges. There was considerable variation in the way the other fields--Scientific, Administrative, and Verbal--were chosen. Each held second place in at least one college.

Each of the fields was the main field for some students. Even at the four-year college, the technological field appealed to nearly 5% of the SIGI users.

Locate System

Values used in the retrieval process. If students are using SIGI to their best advantage, one would expect them to select their top-weighted values for use in Locate. We would except Early Entry from this generalization, since that value may be used to control the educational level of retrieved occupations.

Tables College-Initial 14 show that students do, indeed, use their most important values in Locate. At the college where Variety and Helping Others were among the most highly weighted, they were among the five most frequently selected in Locate. At all the other colleges Interest Field, Income, Security, and Independence, which were among the top-weighted values, were among the five most frequently selected in Locate.

At one college, Early Entry ranked seventh in frequency of use in Locate. The modal specification on Early Entry at this college was 2-3 years. This is the college where more than half the users were over 25 years old, who, perhaps, might feel the greatest pressure to avoid a long delay in entering an occupation. The fact that Early Entry was used fairly frequently in Locate even though it ranked last in importance shows how SIGI affords opportunities for students to control all aspects of the decision-making process.

We may also note from the Tables 14 that all values were used in Locate. Students experimented with various combinations of values in their search for agreeable occupations. This is desirable behavior.

Specification levels and categories. All levels and categories of specification were used. We must remember that the Tables College-Initial 15 record only specifications that retrieved occupations. The specifications at the lowest level may be a consequence of students' being forced to lower specifications in order to make occupations appear. Students may also lower specifications in trying to make some favorite occupation come up. The number of specifications at the lowest level, therefore, indicates that students actually are taking advantage of the system's capabilities. We may also note from the Tables 15 that the Personal Contact field of interest was the one most frequently specified by a wide margin. There is much carryover from Values to Locate, as there ought to be.

Occupations retrieved. Since the colleges are generally similar in the values they use in Locate, one would expect them to be similar in the occupations they retrieve. This statement turns out to be true. At all six colleges, the list of occupations most frequently retrieved includes Teacher (several occupational titles taken as a group), Lawyer, Psychologist, Physician, Dentist, and Speech Pathologist/Audiologist.

It is most interesting to note the effect of using Early Entry as a retrieval value in Locate. At the colleges where Early Entry was seldom used, the preponderance of occupations on the list of most frequently retrieved required graduate study for entry or such study was highly recommended; the remaining occupations required a bachelor's degree; and none required less than a bachelor's. At the other college, however, where Early Entry ranked seventh among the retrieval values, only half of the occupations were in the graduate class, and 21% of them did not require a bachelor's degree.

Another phenomenon related to use of Early Entry can be seen in the frequency with which Dentist, Lawyer, Physician, and Psychologist were retrieved by novices and initiates (Tables College-Initial 16). The drop in percentage points from novices to initiates is very pronounced at the college with more use of Early Entry. Students who returned to Locate as initiates at this college used values/specifications that retrieved relatively few professional occupations. This behavior is in marked contrast to their behavior as novices. This was not true for the other colleges, at which the professional occupations were retrieved with about the same relatively high frequency by both groups.

Occupations never retrieved in Locate. Although no college retrieved every occupation in SIGI, there was no occupation that was never retrieved by one college or another. That is, there is no occupation in SIGI that is unretrievable. The least frequently retrieved occupations--not retrieved by five out of six colleges--were Science Laboratory Technician and Keypunch Operator.

Compare System

Occupations selected for query. If students are following the SIGI decision-making model as intended, the occupations most frequently retrieved in Locate should be selected frequently in Compare. There should not be an exact correspondence, however. Occupations retrieved in Locate meet the limited set of specifications imposed by the student, but they might fail to meet other specifications that Locate does not consider--they cost too much, require abilities the student lacks, involve indoor work, and so on. For example, Dentist was among the most frequently retrieved occupations at all six colleges, but at only one college was it selected more than 1% of the time in Compare. Also, students may retrieve the same occupation several times in Locate with different sets of values/specifications, but they would tend to select it only once in Compare. Finally, the summary data collected by the computer do not follow a single group of students through SIGI; they are simply a count of responses made in each system.

Nevertheless, considerable correspondence does exist between the systems. Examination of Tables College-Initial 17 shows that, at all of the colleges, nearly all of the occupations that were on the list of most frequently retrieved in Locate were selected more than 1% of the time in Compare. (The mean number of selections for 155 occupations is .65%.) Dentist, as already noted, was an exception. Pilot and Optometrist were also exceptions at one college, and Physician and Plumber at another, being on the most frequent list for Locate but not for Compare. At five of the colleges, Psychologist, Lawyer, School Counselor, and Rehabilitation Counselor always led the list of most frequently selected, though not always in that order.

The sixth college, where the list of occupations retrieved in Locate was unusual owing to the use of Early Entry as an educational moderator, was different. A smaller proportion (9 out of 12) of the occupations most frequently retrieved in Locate was selected more than 1% of the time in Compare. At this college the four occupations that were selected most frequently were Psychologist, Legal Assistant, Computer Operator, and School Counselor.

It is noteworthy that every occupation in SIGI was selected in Compare at one college or another. Every occupation is interesting to somebody.

Questions asked in Compare. The colleges were quite similar in the selection of questions to ask in Compare (Tables College-Initial 18). All questions were asked with considerable frequency. Description of Work Activities, Definition of Occupation, and Education Required were in the top five with respect to frequency at all colleges, with Description of Work Activities at the head of the list in each case. Related College Courses, Beginning Salary, and Employment Outlook were also very popular.

It is interesting to speculate on why these questions are so invariably popular. They are the questions that one would ask about unfamiliar occupations. Many of the occupations retrieved in Locate must be new to students. How many of them, for example, would have thought deeply about becoming a Rehabilitation Counselor, a Speech Pathologist, a Personnel Interviewer? It seems likely that students are, indeed, following up in Compare many of the occupations that appeared in Locate, and that they begin their quest with those questions that give a quick idea of what the occupations are like.

The least frequently asked questions were generally Opportunities for Leadership and Prestige Level, as might be expected from the low weight given to the corresponding values.

Prediction System

It is difficult to summarize the data from all six Prediction systems, since each college has a different list of programs that the students can select and since not all programs at a college were predictable on SIGI at the time of the field tests. However, we may make the following observations about Tables College-Initial 19-21, which concern use of the Prediction system:

1. The colleges look very much alike with respect to the way students reported their previous performance. They tended to rank in the second or third fifth, with sizable representation (16% to 28%) in the top fifth and generally smaller numbers in the fourth fifth and bottom fifth. The modal categories with respect to math grades were B and C; with respect to English grades, they were A and B. And the percentage of students who declared that they needed help with English ranged from a low of 18% at one college to a high of 33% at another.

2. There was a total of only five programs for which predictions were never sought--two at two colleges and one at another.

3. Although we do not know what proportion of students availed themselves of the opportunity to ask questions about the prediction process, we believe that the proportion was substantial. Comparison of the n's for questions with the n's for reports of previous performance (both n's correspond to students, since few students report their previous performance or ask questions more than once), suggest that from 37% to 83% of the students ask a question. No question stands out as having been selected above the others; they were all about equal in prompting students' inquiries.

Strategy System

In Strategy, we look for evidence that knowledge of Desirability Sums and estimation of risks have had an effect on the students. Unfortunately, the summary data do not shine a bright light in this corner, for they are simply a count of responses, not changes. Nevertheless, we can make some inferences from the Tables College-Initial 22, which indicate the frequency with which students designated an occupation as first-choice before receiving information about desirability and risk ("PRE" column) and after receiving it ("POST" column). When the frequencies are different, some change has occurred. We will not count the instances where the post frequency is smaller than the pre, because the difference may be due to the fact that a student left before he made the post response. But those instances where the post frequency is greater than the pre must represent bona fide changes of preference, presumably owing to the information the student had just seen. These instances would, of course, be only a small part of the total number of changes, since we have ignored the occasion when the pre was higher than the post, and we have no measurement at all of how many compensating changes may have occurred when the two frequencies were the same. Nor do we wish to imply that change of preference is necessarily a desirable outcome in Strategy; it just happens to be an outcome that indicates that an effect did occur in Strategy, and that is one thing we want to know.

The Tables College-Initial 22 do, indeed, record numerous instances of such change. In fact, they range from 13%[1] of the post-frequency n at one college, up to 23% at another. The actual number of changes must be much larger. Moreover, there must have been numerous occasions when the effect was confirmation of the pre choice, and no change occurred.

It is interesting to notice particular changes. One can sometimes detect from them the effect of seeing the Desirability Sums and the estimation of risks. For example, Rehabilitation Counselor was generally retrieved in Locate and pursued in Compare. But probably few students had considered it before they found it in SIGI, and it apparently did not loom large in their expectations when they entered Strategy. But at every college, the post frequency for Rehabilitation Counselor was much larger than the pre frequency. The amount of increase ranged from 2 at one college (from 9 pre to 11 post) to 10 at another (8 pre to 18 post).

We may also look at Strategy to see how students respond when confronted with a choice of an occupation with the highest Desirability Sum but not the

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[1] Reduced to a formula, the computation is as follows:

$$\sum_{i=1}^{155} d_i \Big/ \sum_{i=1}^{155} f_{i2} \times 100$$

where $d_i = f_{i2} - f_{i1}$, if $f_{i2} > f_{i1}$

$d_i = 0$, if $f_{i2} \leq f_{i1}$

f_{i1} = pre frequency

f_{i2} = post frequency

best chances, an occupation with the best chances but not the highest Desirability Sum, and an occupation with neither the highest sum nor the best chances. These options are the second, third, and fourth items of "Which Strategy" in Tables College-Initial 23. (The other options under "Which Strategy," which do not require a thoughtful decision from the student, cannot all exist at the same time as options two, three, and four.) If we take the sum of the frequencies for this set of three options as 100%, we find considerable differences among the colleges in which option was chosen most often. At one college, almost 67% of the respondents chose the option with the highest Desirability Sum, despite the increased risks; at another college, only 41% of the respondents did so. At the latter college, 45% of the respondents chose the occupation with the best chances, despite the reduced desirability. At every college at least 11% of the respondents chose the occupation with neither the highest sum nor the least risk (which may have represented the optimum combination of desirability and risk). This variation in response patterns suggests that students are being selective in Strategy, using the full range of available options.

Impact on Students

The preceding sections of this chapter show that SIGI is effective in the sense that students accept it, can use it with a minimum of outside intervention, and apparently can understand what is going on. It appears to be internally consistent, for students retrieve occupations that conform to their more cherished values, and the students generally follow the occupations through Compare and into Strategy. Now we wish to ask whether SIGI is effective in the sense that it produces improvement in students' behavior with respect to career decision-making.

We do not wish to use as a criterion of effectiveness the extent to which a student may have made a commitment to an occupation as the result of using

SIGI. For one thing, we do not think that commitment as a result of three hours' interaction with a computer is a desirable outcome for all students. A sudden shift from complete uncertainty to complete certainty would be suspect; it tells us more about the credulity of the student than about the efficacy of SIGI. Moreover, increasing awareness that occupational decisions may occur several times during the course of one's career shows the futility of using closure on a decision as the criterion of effectiveness. It seems equally futile to measure effectiveness by, say, the amount of information that students carry in their heads about occupations they will never enter, or about the number of occupations they can name, and so on.

Rather than use such criteria, we wish to assess the effectiveness of SIGI by the extent to which it accomplishes its objectives. The principal objective is to develop the autonomous individual capable of making rational decisions. If a student shuts his eyes, pokes a pin at the Occupational Outlook Handbook, and settles for the pricked occupation, we judge his procedure as neither autonomous nor rational, even though the outcome was definite. On the other hand, if he systematically assesses his values, abilities, and resources, and then relates occupational information to them, we would judge the procedure as autonomous and rational, even though the student might not have immediately committed himself to a particular choice.

Therefore, we judge the effectiveness of SIGI in terms of how its users apply a rational process to the decision. In using our instruments--the interviews and questionnaires--we look for evidence that such a process is at work. (For a fuller discussion of process vs. outcome in assessment of career decision-making, see Katz, 1975.)

Interviews

Interviewers looked at the vocabulary students used in talking about their occupational plans, their reasons for considering or rejecting occupations, their awareness of the role of values in decision-making, and their overt behavior with respect to career planning. We had the records of interaction of some of the interviewees, and we were particularly interested in the students' explanation of the responses they had made earlier at the terminal.

It is impossible to quantify the results of open-ended interviews. But making allowance for the subjectivity of the data and the fact that the interviewers were not third-party evaluators, we still found strong evidence that SIGI did have a positive effect on the students. We have detailed some of the interviews in the preceding chapters. Here we may summarize our conclusions.

Acquisition of a vocabulary. When students discussed their attitude toward occupations, they tended to do so in terms of the SIGI values. Indeed, the discovery that their values could be used systematically as a guide in decision-making was a revelation to most of the students and was, in the opinion of the interviewers, the single most persuasive evidence of a rational approach to career choice. The students' new awareness of their values gave them a language for talking about careers. If there was any "Eureka--I have found it!" effect on the students, it was this discovery that values provided a basis for investigation as well as a medium for communication.

Structured approach. The second evidence of rationality was an awareness on the part of the students that decision-making can be structured. Although none of the students made this explicit by reciting the Six SIGI Steps to Sound Decisions, it was often implicit in what they did. Even Carla, who insisted that SIGI had not helped her at all, recognized that the failure was due to her inability to commit herself to values weights. She understood the process, saw that value weights were essential to it and were desirable, and started talks with a counselor to correct her problem. No student thought that the SIGI model was invalid or inadequate.

Purposive behavior. The third evidence of rationality and autonomy was activity on the part of the students directed toward making a choice. The activity took different forms with different students, depending on their perception of their needs. Carla sought treatment for her chronic indecisiveness. Fred changed his courses so that he could prepare for a new occupational goal as an accountant. Sally and Sandy added courses in psychology to their programs so that they could begin pointing toward long-term goals. Irene wrote for occupational information. Paul modified his educational plans so that he would be prepared to teach if he failed to make it into law school. Many made follow-up appointments with counselors, changed majors, explored occupational information off-line, or discussed career choice with friends and parents.

Progress in decision-making. In the opinion of the interviewers, all of the students had moved perceptibly forward in the process of career decision-making. This progress took different forms depending on the student's state of mind when he entered SIGI. If he entered with a definite occupational goal and left with the same goal, "progress" consisted of increased confidence that the choice was now well grounded on information. If he entered with only a vague goal or no goal, progress often consisted of an awareness that reasonable options existed, and that the student would have to make a choice eventually.

Table 3 shows the categories of outcomes we noticed in the interviews. We note that the more definite the student's goal when he entered SIGI, the more definite it was likely to be when he left, even though the two goals were not always the same. When students entered with unclear goals or no goals, they tended to leave without a definite commitment, but with increased clarification of possible goals and ways to proceed toward goal-definition. These outcomes are consistent with our expectations since, as stated earlier, we would be most uneasy if SIGI exerted such a powerful influence on the students that every user emerged with a definite occupational goal. The findings are also consistent with students' responses to question 55, "What role has SIGI played in your occupational choice?" on the experimental questionnaire. At all colleges, the majority of students checked responses 2 and/or 3--"SIGI helped me confirm the choice I had already made" and "SIGI suggested other things that I am considering." Many fewer students checked responses 1 and 4, "SIGI helped me choose an occupation" and "SIGI provided little or no help." The proportion of students who thought SIGI had given them no help ranged from 3% to 18%. The proportion who thought it had helped them choose an occupation ranged from 5% to 17%.

Insert Table 3 about here

Negative findings. Although we found evidence that students were thinking and behaving rationally, the students were often unaware of it. Although they were, for the most part, following the SIGI model for decision-making, many would have had difficulty in saying exactly what the model was. When they talked about outcomes, they often tended to speak in terms of finding an occupation rather than in terms of learning a process for making decisions. Thus many students were in the position of doing all (or most) of the right things, but of not showing that they knew why. Even students who, like Sandy, said how logical SIGI was would have been hard put to explain the logic. We would have liked to find better evidence that the students were able to generalize from the particular SIGI experience to other kinds of decisions.

Questionnaires

Questions 1 through 41 of the control and experimental questionnaires provide objective evidence of the impact of SIGI on its users. Of these questions, numbers 30-34 combine to make up only a single item; questions 35, 36, and 38 are open ended and no comparisons are possible; responses to question 39 cannot be influenced by the impact of SIGI; and question 40 was addressed to students who answered yes to question 39 and the *n*'s were usually too small for statistical tests. These subtractions leave us the 32 items that appear in Table 4 which are susceptible to statistical comparison. The first three questions concern composition of the sample, not outcomes, and hence tell us nothing about the impact of SIGI. Moreover, we should not expect large differences on questions 19-24, which concern attitudes toward decisions--for example, the degree to which students think that chance controls choice of career. SIGI would not have much impact on this item because of a "ceiling" effect: About 90% of the students in each group reject the proposition.

Table 4 combines the results of the Tables College-Initial 1 from the preceding chapters. The table shows that at all colleges significant differences were found in the number of occupations explored (question 5--$p < .01$) and in the extent of use of the career reference library (question 14--$p < .01$ for four colleges; $p < .05$ for the other two).

Insert Table 4 about here

(Of course, significant differences at the .01 level were also found at all colleges on question 18, use of a computer-based guidance system.) At five of the six colleges, the SIGI users were also significantly different ($p < .01$) in their knowledge of which program to enroll in as preparation for an occupation (question 9); the other college was the one where a large proportion of the experimentals had not yet finished SIGI and had presumably not yet encountered the Planning system, where they would have found information about programs of study.

Significant differences at the .01 or .05 level were found at one or more colleges on every question except number 15 (Attendance at career planning workshops), 22 (Choose for myself), and 24 (Plenty of time to choose). It is interesting that there was a significant difference in attitude toward using a computer in career decision-making at only one college (question 41); at that college the SIGI users were more favorably disposed toward computers, while at the other five neither controls nor experimentals objected to them. We may also note that at one college, controls had more definite career plans and rated themselves higher as decision-makers than did experimentals. This was the college where many of the experimentals had not completed SIGI and consequently had not reached a point of closure with respect to these two questions. Differences that did not reach significance tended to favor the experimentals.

We did not anticipate uniformity in results at all colleges. One of the purposes in conducting a field test at six geographically dispersed colleges was to evaluate SIGI under a variety of conditions of use, with different populations, in disparate settings, and in various contexts. The colleges were in six different regions of the country, ranging from dense metropolitan settings through small towns to suburban and rural. They ranged in size from student bodies of 20,000 to about 4,000. They varied in career guidance programs and staffing, in character of faculty and administration. There were variations in characteristics of students--in ratio of men to women, in ages, in enrollment status, in proportions of various racial and ethnic groups, in socioeconomic status, in ability levels.

Yet, interestingly enough, despite all these differences there were great similarities in the way students responded to SIGI and in the impact that SIGI had on their career decision-making. These similarities seem sufficient to justify pooling the data from the six colleges in an attempt to assess the effects of SIGI on "students-in-general."

Pooling the data reveals the results shown in the "All" column of Table 4. There were no significant differences between controls and experimentals in age and sex (questions 1 and 2), but differences in enrollment status ($\underline{p} < .01$), caused by vagaries in control-group selection at two of the colleges. As to the other questions, the SIGI users, as compared with the controls, displayed ($\underline{p} < .01$) a greater knowledge of their values, explored more occupations, knew which occupations met their values, had more definite career plans, thought they could predict their grades better, knew better which program to enroll in for their occupational goal, had greater confidence in their career decision-making ability, used the college career reference library more frequently, talked with guidance counselors more often, used career-related audio-visual materials more frequently, used a computer-based guidance system more frequently, rated themselves higher as decision-makers and higher in their knowledge of occupations, knew more about the occupation they might enter, had seen a counselor in greater numbers within the last two weeks, and were more willing to interact with a computer. Moreover, they would be ($\underline{p} < .05$) less inclined to follow the advice of others, were less inclined to be flummoxed by conflicting advice, were less persuaded that knowledge of marriage plans was crucial to career decision-making, and had a clearer knowledge of their values. They did not significantly differ from controls in their amount of reading and talking about occupations, in their talking to people already engaged in an occupation, in their attendance at workshops, in their doubt that chance played a large part in their occupational choice, in their belief that they would make their own decisions, in their recognition that deciding could not be long delayed, in the frequency of their planning sessions, and in their confidence that they generally made correct decisions.

In summary, both the interviews and the questionnaires show a definite and positive effect of SIGI on its users. From the latter, we see measurable differences between the SIGI users and a group of controls in many different behaviors and attitudes. From the interviews, we see a definite tendency to organize career decision-making around a rational model.

Impact on Guidance Program

The counselor questionnaire (Tables College-Initial 8 and 9) was our main instrument for assessing the impact of SIGI on the guidance programs at the colleges. Besides providing information about the amount of time spent in career counseling, the number of students counseled, and suggestions for improving SIGI, the questionnaire explored the counselors' attitude toward computer-based counseling, problems related to career counseling, SIGI's impact on the problems, and SIGI's impact on the counselors' activities. This section only pertains to the portion of the questionnaire that concerns impact.

Analysis of Questionnaire Responses

The colleges were quite similar in the pattern of responses to most questions on the questionnaire, and we have pooled the data as the best way of generalizing about the results.

Acceptance. Questions 4 through 8 explored counselors' attitudes toward using a computer for guidance. The colleges were all similar in their responses and were overwhelmingly supportive of computer-based guidance. Only 3 counselors agreed with the statement that the use of computers was a fad (question 4), whereas 50 disagreed with it and 5 were not sure. Forty-seven agreed that such systems can relieve counselors of routine duties (question 5), while 8 disagreed and 4 were not sure. The counselors rejected by a wide margin the notion that computer-based guidance is a threat to their jobs (question 6): 53 disagreed with the statement, only 3 agreed, and 2 were not sure. They would also use a computer-based system for their own students (question 7) by a margin of 52 to 2, with 4 counselors not sure. Finally, they believed that computer-based guidance systems can help students make career decisions (question 8): 47 agreed with the statement, none disagreed, and 8 were not sure.

Use of the system. The counselors translated their supportive attitude into practice. Only one counselor out of 57 indicated, in response to question 12 ("Have you referred students to SIGI?"), that he or she had not done so. By a wide margin, they reported that students reacted favorably to SIGI (question 13)--50 saying the response was favorable, none saying it was unfavorable, and 7 saying they had had no opportunity to observe.

Impact on problem areas. Questions 16-22 asked counselors to indicate the degree to which certain conditions were a problem, and question 23 asked whether or not SIGI had had an impact on the problems.

Five out of the six colleges were in general agreement in their patterns of responses, with variations as to whether the counselors regarded a condition as being a major or minor problem. At the sixth college the counselors tended to respond "No problem" more frequently than did the counselors at the other five colleges. There were, however, no really striking differences among the colleges.

The conditions most frequently identified as either major or minor problems are those described in questions 16 ("Getting students to read occupational information"), 17 ("Keeping up to date on occupational information"), 18 ("Identifying sources of occupational information"), and 19 ("Finding time to see all the students who want the help of a counselor"). On question 16, 42 of 55 counselors checked one of the "problem" responses; on question 17, the number was 46 out of 55; on question 18 it was 38 out of 54; and on question 19 it was 36 out of 55. Keeping up to date was the severest problem; it was identified as major by 29 counselors and minor by 17.

The other two conditions were less often cited as a major problem, although they remained minor problems to a substantial number of counselors. "Identifying students who need help" (question 20) was a minor problem to 23 counselors (and a major problem to 8) of 55; "Selecting appropriate programs of study" (question 21) was a minor problem to 25 and a major problem to 4 of 53 counselors.

Did SIGI have an impact on these problems? Forty-six counselors answered this question (number 23), and 42 of them answered yes. The greatest impact was felt with respect to getting students to read (question 16) and keeping up to date (question 17), with 33 and 28 responses, respectively. Sixteen counselors found an impact on question 18 (identifying sources), 14 on question 19 (finding time), 13 on question 20 (identifying students), and 16 on question 21 (selecting appropriate programs). Three counselors indicated that SIGI had had an impact on the problems specified in response to question 22, "Other [problems]."

Impact on counseling activities. In questions 24-27 we tried to evaluate the impact of SIGI on counseling activities. The results are most revealing. If we exclude the responses in the "No opportunity to observe" column, we find that no counselor found a decrease in the number of students he could see, 10 found an increase, and 33 noticed no change (question 24). Only 2 counselors noticed a decrease in the amount of time they devoted to career counseling, 12 noticed an increase, and 26 noticed no change (question 25). The responses to question 26 (length of counseling session) were similar: 4 counselors noticed a decrease in length, 9 noticed an increase, and 27 noticed no change.

There was very considerable agreement on question 27, quality of group discussions about values and career decisions: No counselors noticed a decrease, 25 noticed an increase, and only 9 reported no change.

The patterns of responses were generally similar all six colleges, with the modal response tending to be "No change" on questions 24, 25, and 26, and "Increase" on question 27. At one college, however, 4 counselors noticed an increase in the amount of time devoted to career counseling and none noticed no change (question 25). At another college, the modal response was "Increase" on both questions 25 and 26, with "No change" a close second.

Impact on counseling session. In question 28 we tried to assess the impact of SIGI on the counseling session itself. Did counselors find SIGI students different from non-SIGI students with respect to certain behaviors? Thirty-six counselors indicated that they could tell which of their counselees had used SIGI; 20 were unable to distinguish between the two classes of students. The 36 who recognized the SIGI users indicated whether or not they rated the SIGI users higher on seven behaviors.

By the time we exclude the "No opportunity to observe" responses, the n's become quite small. Yet the responses are consistent at all colleges and show quite clearly that those counselors who were in a position to know perceived that SIGI had exerted a favorable impact on all seven categories of behavior. The SIGI users rated higher on their ability (a) to express the satisfactions they wanted from an occupation (23 yes, 8 no), (b) to state their primary occupational choice (20 yes, 9 no), (c) to mention alternative possibilities (30 yes, 2 no), (d) to indicate sound reasons for their preferences (22 yes, 5 no), (e) to show they were well informed about their first-choice occupation (19 yes, 7 no), (f) to decide what programs of study were suitable for each occupation being considered (23 yes, 4 no), and (g) to evaluate their chances of success in programs being considered (18 yes, 8 no).

Responses to open-ended questions. Not many of the responses to open-ended questions concerned the impact of SIGI on the counselor's activity. When they did concern impact, the comments usually bore out the conclusions we came to on the basis of the quantifiable data. One counselor stated that SIGI had "added to" his or her classroom discussion of values and that it had encouraged students to come in for personal counseling because problems with career choice were often intertwined with personal problems. Another counselor found SIGI had an impact on his conduct of a particular vocational/technical course. Another mentioned that students could explore occupations without taking up a counselor's time. Yet another expressed relief over being spared "routine" tasks associated with career counseling; SIGI had made his life more enjoyable by freeing him for counseling in greater depth.

Summary

The nature of the impact of SIGI on the counselors who work with it is instructive. We find that counselors accept SIGI, use it, and do not feel threatened by it. They agree substantially as to what the main problems are in career guidance, and they think that SIGI has a beneficial impact on each of them. They rate SIGI users higher than nonusers on behaviors that contribute to rewarding discussion in a counseling session.

Yet in light of these positive results, it is interesting to find that no counselor perceived SIGI as taking over the burden of career counseling. For all that SIGI is a machine that runs with a minimum of human intervention, counselors apparently do not turn over to it the whole job of helping students with their choice of occupation. It does not appear that SIGI, used as it was in this study, would bring about a reduction in the size of the counseling staff. Few counselors reported that they were able to see more students because of SIGI, to devote less time to career counseling, or to shorten their counseling sessions. What did happen was that the *quality* of the counseling sessions improved. The students arrived for their appointments with a better background, with better formulated goals, with more definite occupations in mind, and with a more structured approach than did the non-SIGI users. Counselors did not have to take time out from the session in order to provide background and educate the student in basic knowledge. Consequently, the quality of the sessions improved and the students benefited from this improvement as well as from SIGI.

Counseling Configurations

The colleges all used SIGI in different ways, from making it a laboratory unit in a course on career choice to making it purely optional for the student with no adjunctive counseling unless the student sought it. We deliberately avoided making the field tests a contest between the colleges and in this chapter have refrained from identifying the colleges by name to keep comparisons to a minimum. Where differences in results do exist, we do not know whether they are due to different student populations, different geographical regions, different counseling practices, or something else.

According to our measures, however, the results were generally similar at all colleges; no college stood out as unique with respect to the impact that SIGI exerted on the students or the counselors. It seems reasonable to conclude, therefore, that SIGI can be fitted into the counseling practices of a college in various ways and still remain effective. Perhaps, then, the "best" way of using SIGI is the way that best suits the style of the college.

Nevertheless, the counselor questionnaires and questionnaires for experimental students, as well as our interviews with students, suggest that a counseling configuration that allows SIGI and a counselor to supplement each other may be the most satisfying to the student, if not the most effective. Questions 56-63 of the experimental questionnaire asked students whether they would prefer the help of SIGI alone, a counselor alone, or SIGI and a counselor working in tandem on various aspects of career choice. The results were, again, quite similar at all colleges. SIGI alone would be preferred, at five out of six colleges, for finding occupations that fit values (question 59) and, at all colleges, for making values more clear (question 61). Pooled data for these questions show that 55% and 59% of the students would choose SIGI alone for these activities. A counselor alone would be the choice of students at three colleges for help with financial aid (question 60), with SIGI and counselor the choice at the other three colleges. The combination of SIGI and counselor was the choice at all six colleges--usually by a wide margin--for planning a program of study (question 56), getting occupational information (question 57), confirming an occupational choice (question 58), resolving conflicts in occupational choice (question 62), and estimating chances of success (question 63). Furthermore, the counselor alone would be preferred least, generally by a considerable margin, for getting occupational information (question 57), confirming an occupational choice (question 58), finding occupations that fit values (question 59), making values more clear (question 61), and estimating chances of success (question 63).

These results are most interesting. They show that students prefer the computer for those activities that the computer does best--retrieving occupations and operating the machinery of values clarification, such as the values game and values weights. And, although they prefer SIGI alone to a counselor alone for most other activities, they want the support of the counselor as well. These preferences of the students conform well with the perceptions of the counselors, who, as we have seen, would like to turn over to SIGI the more basic and structured activities of career choice, but would like to play a part in the higher level aspects.

These results also appear to agree with the counselors' suggestions as to the best way to make SIGI available to students. Question 29 of the counselor questionnaire was, "How do you think students should gain access to SIGI?" Either option 3 ("Counselors should refer students to SIGI and require a follow-up session with a counselor") or option 4 ("SIGI should be used as part of a career guidance unit in a classroom course") was the first choice; at two colleges there was a tie between these options. Thirty-five percent of the respondents (excluding the responses to Other) checked option 3 and 36% checked option 4. The least acceptable option, with only 10% of the responses, was the second, requiring all students to use SIGI in their first year and requiring a follow-up session with a counselor. Option 1, making use entirely voluntary and follow-up sessions optional, received the remaining 19% of the responses.

Putting all this information together, we conclude that the counseling configuration perceived as "best" is one in which SIGI and counselors work together, one supplementing the other. SIGI's role is to do the groundwork--to provide an algorithm for decision-making, a vocabulary for communication, the basic steps of values clarification, the retrieval of relevant information, and so on. The counselor's role is to interpret, explain, and supplement, as well as to help with personal problems.

One-on-one counseling is expensive and might be impossible if a college had many terminals, each of which was interacting with 675 students per year. These facts suggest that the counselor's contribution can best be realized through some kind of group counseling. Using SIGI in conjunction with a course or seminar on career choice seems a logical arrangement. Students in a group would be progressing through SIGI at approximately the same speed and would have a common experience to share. The structured setting of a formal course would allow instructors (presumably, counselors) to fill in those aspects of career choice that are not covered by SIGI and to build on their experience with previous students.

We should mention here that some of the counselors at one college used SIGI as the laboratory for a course that concerned career choice, among other things. They followed a pattern of explaining the objectives and features of a SIGI subsystem in one class meeting, assigning students to use the subsystem, and having a "debriefing" discussion in the next class meeting, followed by a preview of the next subsystem. The counselors used the Counselor's Handbook for SIGI (Appendix G) as the basis for the classroom discussion. (Each counselor at every college gets a copy of the Handbook.) Although the Handbook was not designed as a textbook, the counselors thought that the combination of SIGI-Handbook-discussion was effective.

We do not know whether such a configuration would be "best" for all populations of SIGI users. The field tests included a quite diversified population with respect to age, sex, ethnicity, race, and ability. But it might happen that a population consisting, for example, only of older persons faced with the so-called mid-career change or older women returning to the marketplace would not respond to the group approach. Moreover, we note that substantial numbers of students in our sample preferred SIGI alone for each of the activities covered by questions 56-63. Therefore, SIGI should also be made available to students who want to use it *ad libitum* without being compelled to see a counselor as part of the bargain.

Finally, we mention an element of the counseling configuration that we observed at all colleges. This was the effort on the part of the colleges to integrate the career information center with SIGI and counselors to form a comprehensive career guidance program. At one college the SIGI occupation numbers were used to cross-index printed and audiovisual materials on file in the center. Counselors and students made tape recordings of workers in some of the occupations, and these were cross-indexed, too. At two other colleges, funds from Advanced Institutional Development Program (AIDP) grants were being used, in part, to build up the centers. At both colleges the SIGI terminals had been placed in the centers. Since the occupational information in SIGI is necessarily compressed, it is vital for the college to supplement it with materials in greater depth. The student obviously benefits if these materials are tied in with SIGI.

Table 2

Pooled Responses to Questions 42-54 of the Questionnaire for Experimentals

Question	Grade A	B	C	D	F
42. How interesting was SIGI to you? (n = 390)	54[a]	32	12	2	0
43. How clear was SIGI in giving information? (n = 391)	55	35	9	1	0
44. Overall, how good is SIGI? (n = 386)	41	46	10	2	1
How useful was SIGI in each of the following?					
45. Helping you decide what occupation to prepare for? (n = 387)	22	39	26	8	5
46. Helping you become more aware of your values. (n = 389)	60	25	10	4	1
47. Showing you the relationship between values and career decisions. (n = 389)	52	33	12	3	1
48. Helping you find out which occupations might fit your values. (n = 388)	45	34	14	5	2
49. Helping you get information about occupations. (n = 388)	55	30	12	3	1
50. Helping you understand grade predictions expressed in probabilities. (n = 379)	25	34	32	6	3
51. Helping you estimate probabilities of success in one or more programs. (n = 382)	25	37	30	6	2
52. Giving information about programs of study at your school. (n = 382)	31	27	26	12	4
53. Helping you plan a program appropriate for an occupation you are considering. (n = 382)	28	36	22	9	4
54. Helping you learn how to make career decisions. (n = 383)	33	40	21	5	1

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[a] All figures are percentages.

Table 3

Outcomes of the SIGI Experience in Terms of Status at Entry

Entry status	Outcomes			
Clear occupational goal.	Confirm choice and get collateral benefits. Ex.: Lillian. Confirmed Speech Pathologist. Changed program to include teaching as a contingency occupation.	Confirm choice through exploration and rejection of alternatives. Ex.: Bob. Confirmed goal of managing family liquor store after studying alternatives.	Change goal after exploring alternatives. Ex.: Fred. Decided against assured managerial position in a diesel repair shop and began preparation for Accountant.	Confirm immediate goal and get more ambitious long-range goal. Ex.: Sally. Confirmed immediate goal as Social Service Aide, planned preparation for Rehabilitation Counselor.
Unclear occupational goal or no goal.	Find a goal. Ex.: Mike. Forced by injury to abandon Plumber, explores and accepts Accountant.	Lean toward a goal without final commitment. Ex.: George. Started with interest in English, psychology, and science. Left with idea of Civil Engineer or some other engineering.	No goal, but increased awareness of decision-making process. Ex.: Irene. Started with interest in occupations involving personal contact. Left with awareness that values and rational methods are important in decision-making. Wrote for occupational information.	

Table 4

Summary of Comparisons of Experimental and Control Questionnaires

	College						
Number and nature of question	1	2	3	4	5	6	All
1. Age				**			
2. Sex							
3. Enrollment status				**		**	**
4. Knowledge of values	**	**	**				**
5. Number of occupations explored	**	**	**	**	**	**	**
6. Know occupations that meet values			**			**	**
7. Definiteness of career plans	**	**	**			*[a]	**
8. Ability to predict grades	**		*	*		*	**
9. Know program to enroll in	**	**	**	**	**		**
10. Confidence in career decision-making	*	**	**				**
11. Amount of reading about occupations	**		*		*	**	
12. Amount of talking about occupations	*						
13. Talking to people in an occupation	**						
14. Use of college career reference library	**	**	**	*	**	*	**
15. Attend career planning workshops							
16. Talking with guidance counselors	**	**				*	**
17. Using career-related AV materials		**	*		**		**
18. Using a computer-based guidance system	**	**	**	**	**	**	**
19. Would follow advice of others						*	*
20. Chance controls choice of occupation			*				
21. Conflicting advice makes choice hard		**	*				*
22. Will choose for myself							
23. Must know marriage plans before choosing				**		**	*
24. There's plenty of time to choose							
25. Self-rating as a decision maker	**	**	**			*[a]	**
26. Self-rating on knowledge of occupations	**	**	**				**
27. Frequency of planning	*		**				
28. Confidence in decisions	*	*	*				
29. Clarity of knowledge of values	**	**	**				*
30-34. Information test		**		*		*	**
37. Seen counselor in last two weeks					**	**	**
41. Attitude toward computer interaction					**		**

[a] Controls higher than experimentals

*$p < .05$

**$p < .01$

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CHAPTER XII

THE VALIDITY OF THE SIGI PREDICTION SYSTEM

The Prediction system in SIGI aims to help students assess their probabilities of success (or risks of failure) in the early stages of college programs that are deemed preparatory for various occupations. While research gives scant encouragement to predictions of success in occupations themselves (e.g., Ghiselli, 1966), performance in educational settings has tended to be consistently predictable (e.g., Lavin, 1965).

The SIGI prediction system is unlike more familiar prediction systems. Typically, in most prediction studies or practices, predictor variables include a set of test scores, along with previous academic record, biographical data, sometimes scores on interest and/or personality inventories. If a test battery is used, the number of tests included is not likely to exceed six or seven. The criterion is likely to be freshman GPA, or sometimes GPA in the first term of a program (such as accounting, data processing, dental assisting, secretarial science, arts and humanities, etc.), or occasionally a specific course grade.

In such systems, there are certain problems on both the prediction and criterion sides of the equation which the SIGI prediction system attempts to avoid. On the criterion side, freshman GPA, though satisfactory for admissions purposes, is not satisfactory for guidance. At best, it might help a student differentiate one institution from another, but that is not the issue when a student is already enrolled or about to enroll in a given institution. GPAs in the first terms of various programs tend to be little more useful; they are likely to be intercorrelated as an artifact of the common distributive requirements generally encountered.

Thus, if Freshman Composition and History of Western Civilization are taken by students in many programs, those common components of the programs will militate against usefully differential or comparative predictions of GPA in the programs.

The SIGI prediction system uses criteria which are more likely to be differentiated: end of term marks in the "key course" for each program. The key course is identified by the faculty as a course that comes early in the sequence for a program, represents the entire program well, distinguishes between students who perform satisfactorily in the program as a whole and those who do not, and (ideally) is unique to a given program. This criterion focuses on what is distinctive in each program and avoids high intercorrelations across criteria insofar as possible.

On the predictor side, the trend toward open-door colleges has brought with it a tendency to deemphasize the use of tests. Many institutions use no standardized tests at all, either for admissions, placement, or guidance. Furthermore, the limited number of tests typically available and the similarity in the abilities tapped by them (usually verbal and quantitative), are not likely to provide good comparative or differential prediction across the full variety of programs offered at most two- and four-year colleges.

The SIGI prediction system, on the other hand, is designed for use with or without test scores. It includes not only such traditional variables as test scores (when available) and previous record, but also a set of predictor variables derived from informed self-estimates. That is, the system provides students with unusually detailed criterion information, which includes a distribution of grades for previous students taking the course and "grade achievement factors" identified by instructors as necessary for getting good grades in a course. Students rate themselves on these factors; then, using all the information provided about each course, they are guided in selecting and combining elements from their own experience and knowledge of themselves to forecast their performance on the described criterion. These ratings and self-estimates, which are incorporated into a regression system, provide a unique set of predictors for each criterion, since the criterion information can focus on what is distinctive about each course. This condition enhances opportunities for both differential and comparative prediction (Katz & Norris, 1972).

Empirical Studies

The literature on self-predicted performance was sufficient (see Baird, 1976) to warrant the risks involved in developing the SIGI prediction system to use informed self-estimates, as well as test scores (when they were available) and previous school performance in the pool of possible predictor variables. The actual prediction equations were then developed empirically for each key course at each field-test site, and proved to be satisfactory in absolute terms, with validities of .40 or better for a wide variety of courses as diverse as Chemistry and Ornamental Horticulture. Nevertheless, the question lingered, how do the validities of predictions made in the absence of tests compare with validities based on test scores? To answer this question, two separate studies were made, one at each of the two field-test sites that require tests of all entering students.

Illinois State University Study

The first study was undertaken at Illinois State University, where records of scores on the American College Testing Program (ACT) were available for all students. Four key courses with adequate enrollments were selected to represent a diversity of subject areas: English, History, Physics, Speech. On the first day of classes, a Student Questionnaire (see Prediction System Manual, Appendix A) was administered to students in all sections of these key courses. At the end of the term, a final grade was recorded for all students who had completed the questionnaire, as indicated in Table 5.

Insert Table 5 about here

Data Analysis

The predictor variables (from the SIGI Student Questionnaire and from records of ACT scores) are defined in Table 6. Zero order correlations were computed between all predictor variables and final grades in each course (Table 7). In addition, separate step-wise regression analyses were carried out to predict grades in the four key courses--English, Physics, History, and Speech. Variables were stepped into the equation if they contributed a value of .01 or greater to R^2. No more than three variables were included in any one equation (Table 8). For each of these courses, three sets of variables were used as the pool of possible predictors--(1) SIGI variables alone, obtained from the Student Questionnaire, (2) ACT scores alone, and (3) SIGI variables plus ACT scores.

Insert Tables 6 and 7 about here

Findings

As can be seen from Table 7, students' informed self-estimate of final grade (EST) is one of the best predictors of final grade. For two of the courses, Physics and History, it is the single best predictor. For the remaining two courses, English and Speech, students' report of high school English grade (ENG) is found to be the single best predictor.

With the exception of good writing ability (WRIT), each of the competencies identified by instructors has a sizeable correlation (.32 or greater) with grades in one of the key courses. Rank in high school graduating class (RANK) and high school mathematics grade (MATH) also have sizeable correlations with final grades, falling in the range of .25 to .39.

Zero-order correlations for ACT scores and final grades are sizeable, too, falling in the range .20 to .37. The highest level of prediction achieved by a single ACT score is, with the exception of Physics, close to the level achieved with a single SIGI variable (.31 and .44 respectively for English; .37 and .38 for History; .36 and .47 for Speech).

The sizeable negative correlation between AGE and physics grades (-.33) is not unexpected. A possible explanation is that the rapid advance of knowledge in physics and the concomitant changes in the high school physics curriculum may have put the older student at a disadvantage by making his academic preparation in this field inadequate. Also, the period of time in which older students have been out of school may have resulted in the forgetting of required mathematics skills.

Results of the stepwise regression analyses are presented in Table 8. Correlations are given using one, two, and three variables drawn from the pool of SIGI variables alone, ACT scores alone, and SIGI variables plus ACT scores.

Insert Table 8 about here

The findings are consistent across the four courses: (1) multiple R's using two or three SIGI variables are quite high, falling in the range of .45 to .66; (2) multiple R's using two or three ACT scores fall in the range from .32 to .46; (3) SIGI variables afford a higher level of prediction than do ACT scores; and (4) the addition of ACT scores to SIGI variables does not appreciably improve the prediction levels.

Discussion

The findings in this study, based on a small number of courses at one college, are obviously limited in the extent to which they can be generalized. However, as applied to the four courses at ISU the findings are clear-cut: in an actual career guidance setting, nontest variables which include students' self-ratings and informed self-estimates of performance do provide satisfactory validities and appear to be more valid predictors of college grades than are test scores. (It may be added that similar validities for the SIGI variables have been found in predicting grades for a wide variety of key courses at several other colleges.)

A unique feature of the self-estimates used in the present study is that they are made after students have read detailed information about the criterion. A natural course of inquiry would thus lead to examining whether an improvement in validities is apparent over those obtained in the absence of such information. Unfortunately, the design of the present study does not allow for such an assessment since a control group provided with little or no information was not employed. While the presently reported validities are generally consistent with the validities of self-predictions reported in the literature, differences in criteria, procedures, and the like prevent direct comparisons with the no-information condition. Additional experimental studies should be conducted to examine the impact of various kinds and amounts of criterion information on students' ability to predict their own performance. Also needed is an examination of the extent to which students vary their estimates across courses.

Aside from validity considerations, there is much to be gained from giving students information and having them get actively involved in the prediction process. Students frequently feel that test scores do not reflect their true potential. Educating them about the criterion and having them estimate their own performance in the light of information provided encourages them to be honest with themselves. One of the SIGI frames introduced to students as "GIGO" makes this point, "In computer talk, GIGO means 'Garbage In, Garbage Out.' If you feed false information into the computer, you will get false information out of it." Of course, self-estimates will only succeed if there is no reason for deception, i.e., students are not penalized for accurate assessment. SIGI provides such assurance by maintaining a policy of privacy.

Mercer County Community College Study

A second study was conducted at Mercer County Community College, which administers the Comparative Guidance and Placement (CGP) tests to entering students. Again, the test-based and nontest validities were compared, this time for a larger number of key courses.

Sample and Procedure

On the first day of classes the SIGI Student Questionnaire was administered to students enrolled in all sections of twenty-three key courses. As used in developing Prediction systems at all of the field-test colleges, the questionnaire included succinct descriptions of four kinds of competencies: grade factor 1, commitment to the program of which the key course was a part (the description of this factor was the same for all courses); grade factor 2, interest in subject area, which consisted of a description of course content and activities; grade factors 3 & 4, two other competencies, such as willingness to engage in classroom discussion, regular completion of homework, ability to perceive spatial relationships, and so on, that were regarded by faculty as contributing to good grades in the course. (These usually differed from course to course; for examples, see the last two columns in Table 9.) Thus, for each course there were four factors, two of which had been selected by persons teaching the course. The questionnaire also provided a histogram showing the distribution of grades of previous students and, in addition, asked about the student's age, sex, and past academic performance. Students were required to rate themselves on each of the four grade factors, to consider the grade distribution and their own past performance, and to estimate their final grade in the course in the light of all this information. CGP scores were available from college records. At the end of the term, a final grade was recorded for all students who completed a questionnaire.

Ten courses with adequate enrollment ($\underline{n} > 50$) are discussed in this study. Table 9 gives the sample size for each course and the names of the two distinctive grade factors (factors 3 & 4) identified for the course.

Predictor Variables

The predictor variables are defined in Table 10. The nontest variables are self-reported by students as responses to a multiple-choice questionnaire. (The single exception is HRS, which was left open-ended.) The categories for the students' responses are shown in the last column on the table. The grade factors 3 & 4 for each course are shown, as mentioned above, in Table 9.

The first six tests in the CGP battery consist of 20-40 items in multiple-choice formats. There are three levels of the mathematics test with two parts at each level; TOMATH is the sum of the two parts for the level administered to the student. The ACMOT score is derived from 10 items which are related to the student's self-concept, selected from a biographical inventory.

Insert Tables 9 and 10 about here

Findings

Table 11 presents the zero order correlations between final grades in ten courses and all predictor variables. A scan of these correlations reveals wide variations both across variables within a course and across courses for any one variable.

The following observations highlight the findings in Table 11:

(1) For seven of the ten courses (AC, AR, BA, BY, CH, DP, NS), the highest correlation with final grades was obtained with one of the tests from the CGP battery. These correlations fell in the range .33 to .50.

(2) For three of the ten courses a nontest variable had the highest correlation with final grades (EG, MA, VA); these correlations were in the range .30 to .55.

(3) Among the nontest variables, some aspect of high school performance (ENG, MATH, RANK) tended to be the single best predictor of final grades.

(4) Students' informed self estimates (EST) tended to have moderate correlations with final grades, which (with the exception of Nursing) fell in the range of .18 (AR) to .42 (CH). The low correlation for Nursing (.06) can be explained, at least in part, by the fact that both the criterion and the self-estimates were restricted in range. These restrictions were probably due to the highly selective screening procedures followed for admission to the nursing program.

(5) Grade factors, which include commitment to a program (COMM), interest in a subject area (INTR), and two competencies identified by instructors teaching a course (FAC3 & 4--named in Table 10), are specific to a course and can be tailored to distinctive conditions associated with good grades. Consequently, sizeable correlations across diverse kinds of courses were anticipated. As one can see from the table, however, the correlations varied greatly and were, in general, only moderate to low, with some exceptions provided by commitment to a program (COMM). Table 11 includes two other grade factors with sizeable correlations in addition to COMM: FAC3 (Spatial Relationships) had a correlation of .40 with Visual Arts grades; FAC4 (Quantitative Skill) had a correlation of .36 with Algebra and Trigonometry grades. These occurrences of respectable correlations suggest that grade factors do have predictive potential.

With insufficient data one can only speculate about the causes of the wide variability in grade factor correlations across courses. The nature of the courses themselves, i.e., academic vs. vocational, does not seem to be a contributing factor. A reasonable speculation is that instructors varied greatly in their awareness of the grounds on which they base grades, with the result that they may have selected factors that are not highly correlated with the grades they actually assigned.

(6) The variables SEX, AGE, and HRS tended to be rather poor predictors of grades. The one exception noted for SEX was in English, where, as might be expected, females tended to get better grades than males ($r = .30$); the major exception for AGE was in Nursing, where the r of .38 confirms one's intuition that maturity and experience are logically related to doing well in the course.

In addition to the zero-order correlations between variables and final grades, separate stepwise regression analyses were carried out for each course. Variables were stepped into the equation if they contributed a value of .01 or greater to R^2. No more than three variables were included in any one equation. For each of these courses, three sets of variables were used as the pool of possible predictors: (1) nontest variables only, (2) CGP tests only, and (3) nontest variables and CGP tests.

Insert Table 11 about here

Results of the stepwise regression analyses are presented in Table 12. Correlations are given using one, two, and three variables. These findings are summarized below:

(1) For five courses (CH, DP, EG, MA, VA), the nontest multiple R's were as high as or higher than the test multiple R's. For these five courses, the multiple R's using three nontest variables ranged from .38 (DP) to .64 (VA).

(2) For five courses (AC, AR, BA, BY, NS), higher multiple R's were achieved with CGP tests than with nontest variables. For these five courses, the multiple R's using three tests ranged from .54 (NS) to .60 (AR).

(3) Pooling test with nontest variables enhanced prediction over that possible with either set of variables alone for all but two courses (AR and EG). The increases in multiple R's were, however, generally modest. For example, using nontest correlations as the referent, the addition of tests to the predictor pool increased the multiple R's by amounts equal to or less

than .09 for seven of the ten courses (AC, CH, DP, EG, MA, NS, VA). The increases in multiple R's for the remaining three courses (AR, BA, BY) were .12, .13, and .11 respectively.

Insert Table 12 about here

Discussion

Validities derived from nontest variables for final grades in ten college courses fell in the range of .38 to .64, which compares favorably with the range generally provided by test batteries (in this case, from .34 to .60). Such validities are sufficiently high to suggest that nontest approaches to prediction are satisfactory alternatives to tests, at least when the purpose of the prediction is to help students make career-related decisions rather than to help the college with admissions, placement, or diagnosis.

Comparisons of the nontest validities with those obtained for the same students using the CGP test battery support the suitability of the nontest approach. For five of the ten courses studied, the nontest validities were as high as or higher than the test validities; for the other five courses the differences were modest, ranging from .03 to .12 in favor of the tests. For one course, Visual Arts, the nontest variables were much better predictors than were the tests. Two of the nontest variables (COMM and FAC3) produced zero-order correlations of .55 and .40 respectively, whereas the best test predictor (TOMATH) yielded a zero-order correlation of only .29. Visual Arts is a subject that one intuitively feels would be hard to predict by means of standardized tests because success does not appear to draw primarily on academic skills. The fact that intuition is borne out in this instance suggests that other nonacademic courses may be susceptible to prediction by variables tailored to the coursework. This is an area that merits further investigation.

Advantages of Test-Free Predictions

Going beyond the data from the two studies reported here, one may suggest that level of validity should not be the only consideration in evaluating a nontest approach to prediction. There are other reasons for using nontest predictor variables even though tests increased the validities about half the time at one college. A test-free program can give open-admission colleges and colleges that have abandoned mandatory testing the opportunity to provide useful information to their students, the absence of tests notwithstanding. The nontest approach is particularly relevant to course selection for career decision-making, since it focuses on single key courses of interest rather than on general academic ability; furthermore, because it depends on up-to-date predictor variables rather than on tests that may have been taken in the more or less remote past, the validities are not likely to be subject to decay. Also, since the student-users themselves provide the information for the predictions, students are not likely to regard them as biased; the results are likely to be more acceptable to students than are test scores.

One final advantage should be mentioned: The nontest techniques may produce educational benefits for both students and faculty that tests cannot provide. Students become active rather than passive participants in the prediction process, since they must examine their previous school performance, rate their academic competencies and tastes, and judge their likely future performance. This taking stock is a healthful activity in its own right. Faculty benefit in two ways. First, in selecting the grade factors, they have to think about and make explicit their bases for awarding grades. As noted above, the factors they think contribute to good grades frequently may have little correlation with the grades they actually assign. Second, when this information is fed back to the faculty (and it is being fed back to them at the colleges where SIGI is in use), they can re-evaluate and modify their grading practices. One can conceive of an iterative process whereby faculty would select a set of grade factors and get information as to their efficacy. On the basis of that feedback, they would either modify their grading practices or search for better factors or both, and then try again. It may be possible eventually to increase validities to a significant degree in this way, and also to give students useful predictions about more courses which, like Visual Arts, are hard to predict by traditional methods.

It is expected that additional studies will extend further the validities of nontest variables in prediction. One approach is to have students who have just completed a course, as well as faculty, identify relevant grade achievement factors. (We have already discovered that students often do not agree with faculty about such factors.) Another approach is to use the entire list of grade achievement factors for every key course, thus avoiding faculty judgments about relevance entirely. Exploratory work indicates that this approach is likely to increase validities in a number of instances.

Table 5

Illinois State University Sample

Key Course	No. of Completed Questionnaires
English	54
Physics	52
History	108
Speech	49

Table 6

Predictor Variables at Illinois State University

SIGI Variables

AGE: (18 or under; 19-21; 22-24; over 25)

SEX: (M, F)

ENG: Average high school English grade (A+, A, A-; B+, B, B-; C+, C, C-; D or below)

MATH: Average high school mathematics grade (A+, A, A-; B+, B, B-; C+, C, C-; D or below)

RANK: Rank in high school graduating class (Top fifth, Upper fifth, Middle fifth, Lower fifth, Bottom fifth)

COMM: Commitment to the program of which the key course is a part (Above average, Average, Below average)

INTR: Interest in subject area of the course (Above average, Average, Below average)

*QUAN: Quantitative skill--Physics (Above average, Average, Below average)

*LOG: Ability to think logically--Physics, Speech (Above average, Average, Below average)

*READ: Good reading ability--History, English, Speech (Above average, Average, Below average)

*WRIT: Good writing ability--History, English (Above average, Average, Below average)

EST: Student's estimate of final grade (A+, A, A-; B+, B, B-; C+, C, C-; D+, D, D-; F)

ACT Scores

ACT 1: English

ACT 2: Mathematics

ACT 3: Social Science

ACT 4: Natural Science

ACT 5: Composite

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*Starred variables are competencies identified by instructors as contributing to getting good grades. The courses to which they apply are indicated.

Table 7

Zero Order Correlations Between Predictors and Final Grades in English, Physics, History, and Speech at Illinois State University

Variable	English	Physics	History	Speech
	Key Course			
AGE	.07	-.33	.04	-.07
SEX	.10	.11	-.12	-.07
ENG	.44	.12	.18	.47
MATH	.31	.36	.25	.37
RANK	.31	.27	.25	.39
COMM	.08	.20	.29	.15
INTR	.21	.25	.36	.17
READ	.33	--	.01	.13
QUAN	--	.35	--	--
LOG	—	.10	--	.32
WRIT	.20	--	.04	—
EST	.19	.59	.38	.45
ACT 1	.31	.20	.37	.36
ACT 2	.23	.28	.25	.21
ACT 3	.28	.21	.30	.29
ACT 4	.20	.27	.21	.24
ACT 5	.26	.22	.26	.28

Table 8

Multiple R's for Course Grades at Illinois State University Using (1) SIGI Variables Alone, (2) ACT Scores Alone, and (3) SIGI Variables plus ACT Scores

Course (N)	(1) SIGI R		(2) ACT R		(3) SIGI + ACT R
English (54)					
ENG	.44	ACT 1	.31	ENG	.44
ENG + READ	.49	ACT 1 + ACT 3	.38	ENG + ACT 1	.50
ENG + READ + AGE	.51	ACT 1 + ACT 3 + ACT 4	.40	ENG + ACT 1 + ACT 3	.54
Physics (52)					
EST	.59	ACT 2	.28	EST	.59
EST + AGE	.63	ACT 2 + ACT 1	.32	EST + AGE	.63
EST + AGE + QUAN	.64	ACT 1 + ACT 2 + ACT 5	.34	EST + AGE + ACT 2	.66
History (108)					
EST	.38	ACT 1	.37	EST	.38
EST + INTR	.45	ACT 1 + ACT 2	.43	EST + ACT 1	.46
EST + INTR + MATH	.52	ACT 1 + ACT 2 + ACT 3	.46	EST + ACT 1 + INTR	.53
Speech (49)					
ENG	.47	ACT 1	.36	ENG	.47
ENG + EST	.55	ACT 1 + ACT 2	.42	ENG + EST	.55
ENG + EST + LOG	.57	ACT 1 + ACT 2 + ACT 4	.45	ENG + EST + ACT 1	.57

Table 9

Key Courses, Sample Sizes, and Grade Factors at Mercer County Community College

Course	Sample Size	Grade Factor #3	Grade Factor #4
AC Principles of Accounting	78	Knowledge of math fundamentals	Regular homework
AR Architectural Drawing	63	High motivation	Ability to visualize spatial relationships
BA Business Organization & Management	60	Good reading ability	Ability to think logically
BY General Biology	62	Good reading ability	Classroom participation
CH General Chemistry	54	Ability to think logically	Quantitative skill
DP Computer Science Introduction	68	Regular homework	Regular attendance
EG English Composition	90	Good reading ability	Writing ability
MA Algebra and Trigonometry	78	Ability to think logically	Quantitative skill
NS Nursing	52	Ability to think logically	Ability to work independently
VA Visual Arts	56	Ability to visualize spatial relationships	Creativity

Table 10

Predictor Variables at Mercer County Community College

Variable	Description	Response categories
	Non-Test Variables	
AGE		18 or under; 19-21; 22-24, 25 & over
SEX		M; F
HRS	Hours of homework per week	(Open-ended)
ENG	Avg. high school English	A+,A,A-; B+,B,B-; C+,C,C-; D or below
MATH	Avg. high school mathematics	A+,A,A-; B+,B,B-; C+,C,C-; D or below
RANK	Rank in high school graduating class	Top fifth; Upper fifth; Middle fifth; Lower fifth; Bottom fifth
COMM	Grade factor 1: commitment to program of which the key course is a part	Top 1/5; 2nd 1/5; Remaining 3/5
INTR	Grade factor 2: interest in content and activities of the course	Top 1/5; 2nd 1/5; Remaining 3/5
GRADE FACTORS 3 & 4	Competencies identified by instructors as contributing to good grades	Top 1/5; 2nd 1/5; Remaining 3/5
EST	Student's estimate of final grade	A+,A,A-; B+,B,B-; C+,C,C-; D+,D,D-; F
	CGP Test Variables	
READ	Reading comprehension	All CGP test scores are reported on a standard score scale from 20-80
SENT	Sentences: ability to write standard English	
TOMATH	Total of two part-scores on math tests at one of three levels, ranging from basic computational skills through 2nd-year algebra	
YR2000	"Year 2000," a test in ability to follow directions	
MOS	Mosaic comprehension, a test in perceptual speed and accuracy	
LTR	Letter groups, a test of non-verbal logical reasoning	
ACMOT	Academic motivation, items on a biographical inventory	

Table 11

Zero Order Correlations Between Final Grades and All Predictor Variables

Nontest Variables	AC	AR	BA	BY	CH	DP	EG	MA	NS	VA
AGE	-02	12	-06	13	14	27	22	16	38	14
SEX	15	-13	03	00	15	-02	30	14	00	12
HRS	15	-09	-02	22	04	18	04	06	-07	08
ENG	21	24	23	33	27	26	30	03	16	28
MATH	44	33	20	30	43	23	11	28	17	22
RANK	36	40	42	22	38	28	27	20	15	22
COMM	11	21	24	20	37	27	23	30	-09	55
INTR	26	03	11	02	09	16	20	33	-16	26
FAC3	25	11	-06	06	11	22	10	21	05	40
FAC4	19	15	-08	26	26	18	00	36	03	27
EST	28	18	19	32	42	20	24	32	06	27
CGP Tests										
READ	39	46	48	33	34	33	21	28	50	02
SENT	40	49	46	45	32	32	19	16	37	06
TOMATH	42	42	27	37	48	19	05	30	16	29
Y2000	41	27	33	17	34	11	07	22	37	15
MOS	30	34	03	15	13	07	16	02	11	21
LTR	47	21	29	17	30	17	13	01	07	03
ACMOT	23	28	17	23	05	03	22	24	03	25

Table 12

Multiple R's for Course Grades Using (1) Nontest Variables Alone, (2) CGP Scores Alone, and (3) Nontest Variables Plus CGP Scores

Course	(1) Non-test R		(2) CGP R		(3) CGP+Non-test R
AC Principles of Acct'g					
MATH	.44	LTR	.47	LTR	.47
MATH+INTR	.50	LTR+READ	.51	LTR+INTR	.55
MATH+INTR+FAC4	.52	LTR+READ+ACMOT	.55	LTR+INTR+MATH	.60
AR Architectural Drawing					
RANK	.40	SENT	.48	SENT	.49
RANK+EST	.44	SENT+ACMOT	.57	SENT+ACMOT	.57
RANK+EST+ENG	.48	SENT+ACMOT+MOT	.60	SENT+ACMOT+MOS	.60
BA Bus. Org. & Management					
RANK	.42	READ	.48	READ	.48
RANK+COMM	.43	READ+ACMOT	.54	READ+ACMOT	.54
---	*	---	*	READ+ACMOT+FAC4	.56
BY General Biology					
EST	.33	SENT	.45	SENT	.45
EST+FAC4	.40	SENT+ACMOT	.53	SENT+ACMOT	.53
EST+FAC4+RANK	.47	SENT+ACMOT+TOMATH	.55	SENT+ACMOT+FAC4	.58
CH General Chemistry					
MATH	.43	TOMATH	.48	TOMATH	.48
MATH+EST	.52	TOMATH+SENT	.51	TOMATH+COMM	.58
MATH+EST+RANK	.55	TOMATH+SENT+MOS	.53	TOMATH+COMM+EST	.61
DP Comp. Sci. Intro.					
COMM	.27	READ	.33	READ	.33
COMM+MATH	.35	READ+SENT	.36	READ+FAC3	.42
COMM+MATH+AGE	.38	READ+SENT+YR2000	.38	READ+FAC3+ENG	.47
EG English Composition**					
SEX	.30	ACMOT	.22	SEX	.30
SEX+RANK	.39	ACMOT+READ	.31	SEX+RANK	.38
SEX+RANK+AGE	.44	ACMOT+READ+MOS	.36	SEX+RANK+AGE	.44
MA Algebra & Trig.					
FAC4	.36	TOMATH	.32	FAC4	.36
FAC4+INTR	.41	TOMATH+ACMOT	.39	FAC4+INTR	.41
FAC4+INTR+MATH	.43	TOMATH+ACMOT+READ	.42	FAC4+INTR+READ	.45
NS Nursing					
AGE	.38	READ	.50	READ	.50
AGE+RANK	.46	READ+YR2000	.52	READ+AGE	.54
AGE+RANK+FAC4	.48	READ+YR2000+LTR	.54	READ+AGE+YR2000	.57
VA Visual Arts					
COMM	.55	TOMATH	.30	COMM	.55
COMM+FAC3	.60	TOMATH+READ	.36	COMM+TOMATH	.61
COMM+FAC3+MATH	.64	TOMATH+READ+ACMOT	.42	COMM+TOMATH+FAC3	.66

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* A third variable was not added since it did not increase the R^2 by at least .01.

** AGE and SEX are not used as predictors in the SIGI prediction system. At Mercer College, English was designated as unpredictable since an acceptable validity could not be reached without these variables.

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CHAPTER XIII

INDEPENDENT STUDIES OF THE EFFECTS OF SIGI

In addition to the research and evaluation carried out by ETS, other studies of the effects of SIGI were conducted independently at a number of the user sites, most of them by the colleges themselves. One evaluation was made under the auspices of a state chancellor's office, another involved a special group of prospective scientists, a third was for a doctoral dissertation--but most of the studies were undertaken because the colleges wanted to find out in their own terms how well SIGI was meeting the needs that had impelled them to install it. As far as we know, only one of these studies has been formally published, and most of them are still in progress. Collectively, they encompass a diversity of samples, procedures, criteria, instruments, designs, and analyses, in some cases overlapping those employed in the ETS study, in other cases quite different. In a few instances, we have detailed knowledge of the methods used, but in others we have seen only preliminary drafts or summary statements, supplemented by occasional telephone conversations and correspondence. We do not necessarily endorse (or reject) the procedures involved in these studies. The summaries that follow, therefore, are by no means definitive; we attempt to extract the gist of the findings available at the time of writing, with no pretense of exhaustive coverage.

Illinois State University

Illinois State University (ISU) was the first four-year college to use SIGI. In a series of papers presented at the meetings of the American Personnel and Guidance Association in Chicago, April 1976, Cochran and others first described in some detail the planning (from 1972 to 1975) to install SIGI as an integral part of its new Student Counseling Center and, concurrently, inaugurate an elective course in career choice that would use SIGI as its laboratory. The sample for a study conducted during the spring semester of 1974-75 consisted of 72 students "who had not yet declared majors." Of these, 48 were randomly assigned to use SIGI immediately and the other 24 to a control/wait group. The Harren Vocational Decision-Making Checklist (Harren, 1966) and the Rotter Locus of Control Scale (Rotter, 1966) were administered to both groups. Three sessions at the SIGI terminal were then scheduled for each member of the treatment group, following which the measures were given again to both groups. Significant differences were found in favor of the experimentals in changes on the Harren Vocational Decision-Making Checklist but not on the Rotter. A report on this study is scheduled for publication in the July issue of the Journal of Counseling Psychology (Cochran, Hoffman, Strand, and Warren, 1977).

Two more recent studies without control groups have also shown significant increases on the Harren Vocational Decision-Making Checklist from pre-treatment to post-treatment. One was reported at the American College Personnel Association meetings in Denver, March 1977 (Cochran, LaFaze, and Rademacher, Note 1). The other, by Warren and Cochran, is still in progress.

Pasadena City College

Pasadena City College conducted a "pilot study" evaluation of SIGI in 1975 (Risser and Tulley, Note 2). Of 100 applicants to use SIGI, 50 were randomly assigned to use SIGI immediately (experimental group) and the other 50 to a testing program with use of SIGI deferred (control group). After the experimental group had gone through SIGI, all students completed a questionnaire.

A similar study has more recently been conducted with a larger sample, comprised of 250 experimentals and 250 controls. Although analysis of all the questionnaire items had not yet been completed at the time of this writing, the second study confirmed the first in finding that significant differences ($p < .01$) favored the experimentals on students' ratings of such items as degree of satisfaction with current educational plans, confidence of success in current educational plans, satisfaction with current vocational plans, confidence of success in current vocational plans, lack of need for help with educational or career planning, and knowledge of college course requirements. The second study also showed a significant ($p < .01$) difference in ratings of increased knowledge of factors which are important in making career decisions. (This difference in favor of the experimentals had not reached the conventional significance level in the pilot study.)

Findings from the pilot study on items that have not yet been analyzed in the second study also indicated that experimentals significantly ($p < .01$) exceeded controls in scores on a test of information about their chosen occupation. Furthermore, counselors gave higher ratings to the value of counseling conferences with experimental students than with controls.

Students' ratings of the helpfulness of SIGI were very favorable, essentially replicating responses to the similar rating scales used in the ETS study. No significant differences were found between experimentals and controls on other criteria in the pilot study, such as completion of the semester or grade-point average for the semester. Finally, no significant relationship was found between experimentals' scores on a reading test and time spent at the terminal.

Santa Fe Community College

At least three doctoral dissertations by University of Florida graduate students have been undertaken on SIGI at Santa Fe Community College. One is still in progress, and we have virtually no information about it. Of the two which have been completed, we have been able to get a copy of only one (Pyle, Note 3). A brief report of the findings was published in The Vocational Guidance Quarterly (Pyle and Stripling, 1976).

The sample consisted of 97 full-time students enrolled in a behavioral science elective, BE 100, "The Individual in a Changing Environment," which is taken by 80% of all Santa Fe students. About a third of the group used

SIGI during a three-week period and also met with the instructor once a week for sessions based on the Counselor's Handbook for SIGI (Chapman, 1976; see Appendix G). A second treatment group of similar size spent the three weeks on a group career unit called Awareness of Career Decision-Making Procedures, or ACADEM (Johnson, Note 4). ACADEM includes six sets of tasks: personal assessment, occupational exploration, tentative occupational choice, educational exploration, tentative educational choice, and implementation of choices; it is designed to be used with college students in small groups and to be completed in about seven and one-half hours. Finally, a third group of BE 100 students served as a control group, with no specific career decision-making activities planned during the three weeks, although if career-related questions were raised, they were addressed in a natural manner. The Attitude Scale of the Career Maturity Index (Crites, 1973) was administered to all three groups immediately before and after the treatments, and reaction questionnaires were administered to the two treatment groups at the end of the three weeks. Other variables used in the analyses were sex, age, and status of occupational decision.

An analysis of covariance(using pre-test scores as the covariate) showed that the SIGI students' adjusted post-test scores were significantly higher than those of the control group, but that the ACADEM students' adjusted post-test scores were not. There were no significant interactions between post-test scores and sex, age, or status of occupational decision.

On the reaction questionnaires, both treatment groups tended to respond favorably to all the questions, with about 84% of the SIGI group and 76% of the ACADEM group making positive responses.

It is our understanding that the other completed dissertation (Devine, Note 5), of which we were unable to obtain a copy at this time, used similar procedures, but showed no significant differences between experimental and control groups. It is also our understanding that both groups showed declines in scores from pre-test to post-test, an unusual phenomenon.

During the summer of 1976, a group of 50 high-ability secondary school students (comprised of equal numbers of males and females) who were enrolled in the Science and Engineering Summer Research Participation Program at the University of Florida under the auspices of the Florida Foundation for Future Scientists and a grant from the National Science Foundation, were given an opportunity to use SIGI at Santa Fe. The director of the program, Dr. Elizabeth Abbott, administered the standard Evaluation Questionnaire to these students. Their responses showed that they found SIGI interesting, clear, and helpful--94% of them gave it an overall grade of A or B. Most of them felt they would profit from further use of SIGI, and every section of SIGI was named by a substantial number as the one that would be used "most." Ninety-six percent said there was nothing that SIGI didn't cover that they would like it to cover. Dr. Abbott plans to continue to schedule "future scientists" on SIGI in the summers to come.

Eastfield Community College

The counselors at Eastfield gave the standard SIGI evaluation questionnaire to an independent sample of 200 students who had used the system. Again, the responses were very favorable, with SIGI graded A or B on interest by 95% of the sample, on clarity by 97%, and on overall helpfulness by 85%.

University of California, Irvine

Although University of California, Irvine, (UCI) was not a field-test site, the Career Planning and Placement Center has been evaluating the effectiveness of SIGI on that campus. A preliminary draft report has been written on the results of a questionnaire administered to 392 students before and after using SIGI. Responses are being cross-tabulated by academic year and program, sex, age, ethnic group membership, residence, and other special groupings (e.g., "returning women"). No control group was used; so obviously we cannot distinguish between change that occurred as a direct result of SIGI and change that might be attributed to time or to the effects of the questionnaire itself. Nevertheless, there were very large differences between pre-treatment and post-treatment responses.

The entire population made substantial gains on all the questionnaire items, which included ability to specify values related to career or occupation, ability to identify career or occupational plans, knowledge about the occupations being considered, and confidence in ability to make career decisions. These highly significant changes ($\underline{p} < .01$) from pre-treatment to post-treatment responses held up across such subgroups as minority and nonminority students; students enrolled in science or liberal arts or unaffiliated; and commuters or campus residents. The sample of returning women numbered only 15, not sufficient to warrant a chi-square analysis, although inspection indicates changes that appear subjectively remarkable. Tabulations of other subgroups involving sex or age were not included in the preliminary draft.

The Career Planning and Placement Center comments on unanticipated benefits from students' very favorable perceptions of SIGI: many students were attracted to the Center by the presence of SIGI; while only 17% of them had used the Center's services before, a number of students have now indicated their desire to come back. As one student expressed it, "If SIGI is an accurate indication of your office, then I'm honestly impressed with the facilities and will return."

The Center believes that SIGI is helping students "start looking at career options earlier, when they first enter college. Freshmen and sophomores are showing interest in considering career objectives; about 90% were able to consider at least one career after using SIGI." The counselors have observed that SIGI stimulates students to "think and question for themselves," and believe that its presence has strengthened their own career counseling skills. The faculty also view SIGI as an effective tool for advising their students: A professor is quoted as saying, "After using SIGI, students are more articulate and conscious of what goes into making a career decision. The issues are sharper for them."

The Career Planning and Placement Center staff and other administrative staff at UCI are exercising leadership in forming a consortium of California universities to join in the use of SIGI. They have hosted a number of demonstrations and conferences for that purpose and have displayed a missionary zeal in encouraging the dissemination of SIGI.

Summary

The diverse studies carried out independently at colleges using SIGI, with varying degrees of rigor and comprehensiveness, reiterate common themes that have appeared in our own studies: satisfaction with SIGI by students and counselors; evidence of effectiveness, however defined, in meeting stated objectives; side effects in enhancing counselors' contributions to students' career decision-making. The evidence appears not only in questionnaires and tests; it comes also from such unobtrusive measures as long waiting lists to use SIGI, the high proportion of users who have been referred by their friends and who spread the word to other friends, the development of courses and various activities at career planning centers to focus on SIGI and integrate it into the total career guidance program, the enthusiastic reception of visitors, and eagerness to see SIGI used as widely as possible.

The fact that the presence of SIGI has prompted independent evaluation and research studies on campuses is itself a bonus. It is useful for colleges to define their objectives in career guidance, to plan programs, to collect and analyze evidence of effectiveness. Thus, SIGI may serve as a catalyst in the process of rational and informed decision-making by the colleges themselves as they strive to meet the career development needs of students.

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CHAPTER XIV

EVALUATIVE HIGHLIGHTS

Technical Aspects of the System

Hardware reliability. The SIGI hardware is all standard equipment that requires no special modification for SIGI. Its reliability is therefore completely independent of SIGI. All six field-test colleges had slightly different hardware configurations, depending on the tasks imposed on the computer in addition to running SIGI. After the installation of SIGI and a short break-in period, all the systems ran smoothly with no malfunctions traceable to SIGI.

Cost. If the current cost of the hardware, software, and maintenance for a basic four-terminal system is totaled over a five-year period in which each terminal is operated 12 hours a day for 225 days per year (a rate of use easily sustained at the field-test sites), the cost per terminal hour would be $1.73. Over the five years, 13,500 students would be able to use SIGI four hours each; the cost of equipment would be $6.92 per student. If the same assumptions are applied to a 16-terminal system, the cost per terminal hour would be $0.90.

Software. The SIGI software, like the hardware, functioned satisfactorily. The time-sharing capability was realized before the delivery of the hardware to the first user college. The response time of the system has been excellent at the only college with as many as five terminals and in a test at ETS with six terminals and additional peripherals all in use at the same time. The system is free of bugs, and the reprogrammed Prediction system, which permits valid predictions without reliance on test scores, has operated successfully at all colleges.

Courseware

Operation. The courseware--the sequences of displays that students actually follow--also proved entirely adequate. A large proportion of students expressed interest in the occupations retrieved for them on the basis of their values. Most students were able to operate the system without outside assistance and to understand what they are doing.

Occupational information. Both students and counselors thought that the quality of the occupational information was high. Three-quarters of the students indicated that it was better than information from other sources, and only one percent thought it was worse. The information covered all of the areas that students were interested in except for data about local salaries and opportunities. The SIGI data base included about 90% of the occupations that students named as being of interest to them. Nevertheless, plans continue for adding new occupations.

Acceptance by students. Students gave SIGI high grades--86% graded it A or B on how interesting it was, 90% on how clear it was, and 87% on its overall "goodness." The aspects of SIGI that concerned clarifying values, identifying occupations that fit values, and finding occupational information received the most A's and B's, and aspects that concerned prediction and planning received the fewest. Enthusiasm for SIGI was high, and over 70% of the SIGI users recommended SIGI to their friends. Over 60% of them wanted to use the system again in the future.

Reading level. Although some students complained about the quantity of reading in SIGI, 92% of the students found the vocabulary and style "Just right." Only 1% found them "Too difficult." Only two counselors out of 45 indicated that the reading level was too hard for their students, one saying that deaf students experienced difficulty with some of the text and the other saying that foreign students experienced some difficulty.

Freedom from bias. Over 98% of the students thought that SIGI was free from sexual, racial, or other bias. Forty-five out of 49 counselors also thought that SIGI was bias-free. Since the students expressing this opinion reflected the sexual, racial, and ethnic composition of the college population, it appears that nearly all members of all groups, including women and minorities, believe that SIGI is unbiased.

Problems and revisions. No single aspect of SIGI stood out as a problem for the SIGI users. Responses to questions about problems were scattered. Operating with a single-terminal system appears to create problems in scheduling and in causing students to feel rushed. For the most part, students liked Values, Locate, and Compare more than Prediction, Planning, and Strategy; but the systems they would most like to use when they return were Prediction and Planning.

Few revisions seem necessary in light of students' acceptance of SIGI. We intend, however, to expand the occupational base. We would also like to devise a procedure that would allow a college to add local occupational information. Three technical changes are under way: increasing the number of occupations that can be retrieved at one time in Locate, making all printouts optional, and simplifying the method of selecting occupations at various points in the interaction. We would also like to make a few refinements in the courseware.

Effectiveness of "Do-It-Yourself" Manuals

All three manuals prepared by ETS to permit operation with a minimum of technical assistance proved effective. The manuals are the SIGI Manager's Guide, the Prediction System Manual, and the Planning System Manual. The SIGI Manager's Guide was sufficiently detailed to enable a technically unsophisticated person to handle all details of the day-to-day operation of SIGI by himself, although he needed help with the data collection sweeps (not a normal part of the operation) and with the installation of additional terminals. Problems in these areas did not occur at colleges where SIGI was operated by personnel familiar with computer operations.

The Prediction System Manual and Planning System Manual also proved sufficient. Following the detailed procedures in the manuals, each college was able successfully to collect the data that result in the course predictions in the Prediction system and to construct the displays that constitute their unique Planning systems. At all colleges the data collection and preparation were done by persons without special training in computer information systems or occupational information. The work was done by paraprofessionals and graduate students working with a regular counselor or by counselors themselves. Extensive consultation with the SIGI staff was not required. All systems run smoothly and appear to be of high quality.

Development of the Prediction and Planning systems produced a dividend for some colleges in the form of feedback. Colleges were informed about changes in the distribution of grades in key courses and about instances when faculty selected grade factors that turned out to have little correlation with final grades. This information has caused reviews of policies concerning grades. The research required for the Planning system has also been beneficial, resulting in extensive revision of the curriculum at one of the colleges and some changes at others.

Development of Test-Free Prediction System

Development of a Prediction system that would be independent of test scores was successful. A test-free system was necessary because only one field-test college had a mandatory testing program. As a result of this work, the SIGI predictions are based on nontest predictor variables, such as previous academic performance, the students' own self-ratings on behaviors associated with good grades in a particular course, and the students' own informed estimates of their final grades. The predictions may also be based on test scores when test scores are available. Studies done at two of the colleges where test scores were available for at least some students show that validities obtained with nontest variables are generally as high as those obtained with test scores and are sometimes higher.

Test-free predictions offer some benefits to the college. Predictions are possible, at least for purposes of guidance, even in the absence of a testing program. Some courses that are hard to predict with the usual measures of quantitative and verbal ability may be successfully predicted by nontest variables that are especially selected to reflect the content of the course. Students become active rather than passive participants in the prediction process and for this reason may find it more acceptable than a testing program. Faculty are induced to examine and make explicit the bases of their grades. Faculty also benefit from feedback showing them how well the grades they actually awarded are correlated with the factors they specified as being important.

Usage of the System

Internal consistency. Summary data collected by the computer show that SIGI had a high degree of internal consistency. The values that were most heavily weighted in the Values system were most frequently selected for retrieval of occupations in the Locate system; occupations that were retrieved most often in Locate were generally among those most frequently selected for examination in the Compare and Strategy systems.

Sufficiency of individual subsystems. The subsystems did what they were designed to do. Each of the 10 values and each of the six interest fields were important to some students. Interest Field and High Income generally were the top weighted values and Personal Contact was the dominant field of interest. Each of the ten values was sufficiently important to some students to be selected for use in the search for compatible occupations in the Locate system. Every occupation in SIGI was retrieved by students at one or another of the colleges, indicating a wide range in the values/specifications used by the students. As expected, professional occupations, such as Teacher, Psychologist, Lawyer, Physician, Dentist, and Speech Pathologist, were retrieved more frequently than nonprofessional ones, for the professional occupations tend to rate higher on the values given the greatest weight by these students. But students were selective, as indicated by the facts that all occupations were retrieved and that at one college with a high proportion of older students, more nonprofessional occupations were retrieved than at the other colleges. Similarly, every occupation in SIGI was selected by at least one student for examination in the Compare system, and every question was asked. Most of the programs for which predictions were available were called for in the Prediction systems, and each of the optional questions that students could ask about the prediction process was of interest to large numbers of students. Also, the data from the Strategy system show that students were influenced by information about the desirability and risks associated with occupations they had selected for study.

Impact on Students

Conclusions drawn from interviews. Interviewers looked for evidence of autonomy and rationality in the students' comments on their SIGI experience. They believed that the students had acquired a vocabulary for communicating about career choice. Students tended to discuss occupations in terms of the SIGI values. The discovery that values provided a basis for investigation as well as a medium for communication gave them an awareness of structure in decision-making. They saw the logic of weighting their values and then using the ensuing knowledge as a means for assessing occupations. Their behavior seemed purposive both at the intellectual and behavioral levels; they seemed to have reasons for liking or disliking an occupation, and they often took steps toward a goal, such as changing programs, seeking outside help, or getting additional information. Also, the students had moved perceptibly forward in the process of making career decisions. When they felt committed to a specific occupation, either the one they had had in mind before going on SIGI or another, they felt, when they finished, that the commitment was well-grounded on information. When they were not committed to a specific occupation at the beginning, progress often consisted of an awareness that reasonable options existed and that they had learned an approach to assessing and either retaining or discarding options.

On the negative side, interviewers did not find that students had completely mastered the SIGI algorithm for decision-making. Although the students were following the model and recognized that it was rational, many of them would have had difficulty describing it to someone else. The interviewers did not pick up much evidence that students were able to generalize from the particular SIGI experience to other kinds of decisions.

Conclusions drawn from questionnaires. Comparisons of responses to relevant questions on the control and experimental questionnaires show numerous significant differences between students who used SIGI and those who did not. More differences were found at some colleges than at others. Yet there were great similarities in the way students responded to SIGI, despite the fact that the colleges were geographically dispersed and were also quite dissimilar in other respects. Pooling the data for all colleges shows significant differences ($p < .01$) between experimentals and controls in that SIGI users displayed a greater knowledge of the rewards and satisfactions they want from an occupation, had more definite career plans, thought they could predict their grades better, knew better which program to enroll in for their occupational goal, had greater confidence in their career decision-making ability, used the college reference library more frequently, talked with guidance counselors more often, used career-related audiovisual materials more frequently, used a computer-based guidance system more frequently, rated themselves higher as decision-makers and higher in their knowledge of occupations, had more accurate knowledge of the occupation they might enter, had seen a counselor in greater numbers within the previous two weeks, and were more willing to interact with a computer. Moreover, they would be ($p < .05$) less inclined to follow the advice of parents and friends, were less confused by conflicting advice, were less persuaded that knowledge of marriage plans was crucial to career decision-making, and had a clearer knowledge of their values and goals.

Impact on Guidance Program

Acceptance. Responses to the counselor questionnaire show a high degree of acceptance of computer-based guidance in general and SIGI in particular. Counselors rejected by a wide margin the notion that computer-based guidance was a fad or a threat to them, and accepted by a wide margin the idea that such systems would relieve them of routine duties and would help students make career decisions.

Use of the system. Only one counselor out of 57 indicated that he or she had not actually referred students to SIGI. All the counselors who observed students' response to SIGI thought it was favorable.

Impact on problem areas. Counselors indicated that SIGI had had a favorable impact on one or another of the areas identified as major or minor problems. More counselors thought that SIGI had had an impact on getting students to read occupational information and on keeping it up to date, which were the most serious problem areas, than thought it had had an impact on less serious areas. But each problem was designated by some counselor as diminishing in seriousness because of the impact of SIGI.

Impact on counseling activities. Counselors do not perceive SIGI as taking over the burden of career counseling. Rather, it improves the quality of counseling sessions. Students arrive for their appointments with a better background, with better formulated goals, with more occupations in mind, and with a more structured approach than do non-SIGI users. Counselors do not have to spend time providing background and educating students in basic knowledge. Consequently, the session can be devoted to matters of substance and the student can get more out of it.

How SIGI Fits in the Guidance Program

Although the guidance programs at the six colleges differed in many respects, as did the colleges themselves, there were great similarities in the way students responded to SIGI and the impact that SIGI had on their career decision-making. This fact suggests that SIGI is sufficiently flexible to be fitted into the counseling practices of a college in various ways and still remain effective. The "best" way of using SIGI, therefore, may be the way that best suits the style of the college.

Nevertheless, students prefer a combination of SIGI and counselors for help in most activities directed toward career choice. Counselors prefer a configuration in which they will play a part in the students' choices. Therefore it seems likely that a configuration which allows SIGI and a counselor to supplement each other may be the most satisfying to all parties, if not the most effective. SIGI's role in this configuration is to provide an algorithm for decision-making, a vocabulary for communication, the basic steps of values clarification, the retrieval of relevant information, and so on. The counselors' role is to interpret, explain, and supplement, as well as to help with personal problems. Using SIGI in conjunction with a course or seminar seems a logical arrangement because of the economies that can be obtained through group counseling. The activities of the career information center should complement the SIGI-counselor combination so that SIGI, counselor, and center form a comprehensive guidance program. SIGI should also be made available to students *ad libitum*.

Independent Evaluations

In addition to the research and evaluation carried out by ETS, other studies of the effects of SIGI were conducted independently at a number of the user sites, most of them by the colleges themselves. The results of these studies, undertaken because the colleges wanted to find out in their own terms how well SIGI was meeting their needs, reiterate the main themes emerging from the main body of this report: satisfaction with SIGI by students and counselors; evidence of effectiveness, however defined, in meeting stated objectives; side effects in enhancing counselors' contributions to students' career decision-making. The evidence appears not only in questionnaires and tests; it comes also from such unobtrusive measures as long wait-lists to use SIGI, the high proportion of users who have been referred by their friends and who spread the word to other friends, the development of courses and various activities at career planning centers to focus on SIGI and integrate it into the total career guidance program, the enthusiastic reception of visitors, and eagerness to see SIGI used as widely as possible.

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